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DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with each copy of this week's issue.

Prosperity Can be Made Permanent

THIS time last year the general feeling of depression was heavy over almost the whole world. Now it has lifted a little and, in contrast, hope has raised its head once more. Nevertheless world trade is far below the level of five years ago, and none can say whether or when it will equal or exceed it. That is because so few have yet come to study economics as a set of man-made rules capable of adjustment to suit any conditions. The phrase "economic blizzard" itself implies a condition beyond human control, but there are actually controllable rules of finance which are ultimately responsible for both slumps and booms, and it is absurd that these conditions should still be regarded as phenomena. Financial rules can and should be designed for the sole purpose of distributing production to consumers. Like figures, they are purely abstract and should merely reflect realities. That they fail to do so to-day is apparent from the obvious fact that there is surplus production of real things and services beyond the present reach of consumers—but not beyond their desire to consume. Just as soon as we agree that the purpose of production is consumption, and arrange our financial system to implement that purpose, so soon will the slump become a thing of the unregretted past, and so soon will permanent prosperity reign in its stead.

Brighter Barter

A Reuters message informs us that the Lithuanian State Railways have offered to make payment in native geese for five narrow gauge locomotives ordered from the Skoda works in Czechoslovakia. Those who retain an old fashioned addiction to hard cash may feel that this is rather like distributing stones in response to requests for bread, and that, although money may be a token, a goose can equally well be a white elephant. We presume, however, that the medium of exchange has been chosen after a discreet sounding of current Czechoslovak taste, in which event the completion of the deal might signal the adoption of the system elsewhere. Electric motor coaches for Greece could appropriately be paid for in currants, for example, and there is no doubt that sallies such as this would assist to lubricate the wheels of industry in the early stages of negotiation and to mitigate the bitterness of captains of industry when they consulted their bank balances. The Lithuanian State Railways are pointing the way towards a new order of currency, and it is to be hoped that if their proposal finds favour in Czechoslovakia, its acceptance will be in the true spirit of barter, and not in the reactionary expectation of finding a golden egg.

* * * *

More Notable L.N.E.R. Running

Remarkable feats of speed are now becoming almost a commonplace on our main lines. Hard on the heels of the record L.N.E.R. runs between London and Leeds on November 30, comes another exploit, in this case made in ordinary passenger service, and by a locomotive twenty-seven years of age. In brief, the Queen of Scots Pullman express was run from King's Cross to Leeds, 185.8 miles, in 185 min. 40 sec.—that is to say, at an average speed of exactly 60 m.p.h.—notwithstanding two dead stops *en route* for adverse signals, three further signal checks (one of them very severe), and the usual slowings at Peterborough, Doncaster, and Wakefield. Analysis of the times which are set out on page 1072 of this issue shows that the net time of the run was 175 min. Despite the age and power of the locomotive in use, this was only 23 min. more than the time of the record run made by *Flying Scotsman* on November 30, and with twice the load. Of particular note was the net average speed of 70.2 m.p.h. maintained throughout the 136.3 miles between Hatfield and mile-post 154, the dead slowing through Peterborough included. Such exploits as these prove that any further acceleration of British train services will not depend merely on the latest locomotive types to make the gains of time on paper effective in practice.

* * * *

Additional East Coast Services

An alteration of importance affecting the East Coast train services of the L.N.E.R. is announced to take effect from January 1. A new express will leave Aberdeen for Edinburgh at 8.55 a.m., calling only at Montrose, Dundee, and Kirkealdy, and reaching Edinburgh (Waverley) at 12.4 noon. This overall time of 3 hr. 9 min. is the fastest which has operated between the two cities for a number of years past; the distance is only 130½ miles, but the route is one of great difficulty in the matter of gradients and speed restrictions. The new service will break up the lengthy interval between the existing 6.10 a.m. and 10.20 a.m. services from Aberdeen to Edinburgh. In the reverse direction the existing 7.25 p.m. express from Edinburgh to Dundee is to be extended to Aberdeen, calling at Arbroath and Montrose, and reaching Aberdeen at 10.43 p.m. This train connects with the 11.20 a.m. Queen of Scots Pullman express from King's Cross, and so, in effect, will provide a new daily service from London,

Leeds, and Newcastle to Aberdeen, arriving at a reasonable hour in the late evening. There will be no corresponding service in the opposite direction, however, as the 8.55 a.m. from Aberdeen will miss the southbound Queen of Scots by about $\frac{3}{4}$ -hr. at Edinburgh (Waverley).

* * * *

Coping with Centenary Traffic in Victoria

On the day that the Duke of Gloucester arrived in Melbourne the Victorian Government Railways had to carry at least 75 per cent. of the burden normally thrown upon other transport systems, and the natural increase in traffic during the opening days of the centenary celebrations was further accentuated by a strike of tramwaymen. To express appreciation of the handling by the Railways Department of this increased traffic the Victorian Minister for Transport, Mr. Kent Hughes, had an informal meeting with officers of the department. The commissioners, heads of branches, union representatives, and stationmasters from the city stations were among those present. "In our opinion a very good job was done," said Mr. N. C. Harris, the Deputy Chairman of Commissioners. "The results indicate that there is a latent capacity for more business in the railways service, and if a fair proportion of that business remained with us there would be a great improvement in the finances." The varying of duties of the staff concerned in working a complicated undertaking such as the Melbourne suburban service is always a heavy task, and Mr. Harris expressed a proper appreciation of this when he added "the officers concerned had very little rest, and I was becoming seriously concerned as to how long we could keep the pace without some of them breaking down under the strain."

* * * *

Still Faster to the Riviera

The acceleration of the Côte d'Azur Pullman express, referred to in detail on page 1069, reminds us that only a few years ago Toulon, 577 miles, was the furthest it was possible to travel towards the Riviera from Paris in a day, and this point was reached at midnight after a journey of about 16 hours. By progressive speeding up it is now possible to leave Paris at the comfortable hour of 10.15 a.m. and reach Mentone, the most easterly French town on the Riviera, and 690 miles away, well within the same day. This is the sort of special acceleration most appreciated by the travelling public. This winter the Côte d'Azur Pullman leaves Paris at 10.15 (instead of 8.15 a.m. last year), covers the 317.3 miles to Lyons in 320 min. (including stops at Laroche and Dijon), and so comes within 30 min. of the time of the high speed Bugatti railcar. It makes Marseilles in the unprecedented time of 9 $\frac{1}{2}$ hr. from Paris, having averaged 57.9 m.p.h. over the 535.3 miles from the capital inclusive of five intermediate stops. Notwithstanding the heavy grades east of Marseilles, commendably fast running continues, so that Nice, 675 miles from Paris, is reached in 12 hr. 20 min.—at 54.7 m.p.h. average speed overall—and Mentone in 13 hr., at 11.15 p.m. The return journey begins at 9.20 a.m. from Mentone and Paris is reached at 10.35 p.m.

* * * *

Pennsylvania Punctuality

Last year we had occasion to comment on a remarkable performance achieved by the Broadway Limited express of the Pennsylvania R.R., which for 362 days out of 365 succeeded in maintaining an "on time" record of punctual arrivals. That such exploits are not confined alone to crack expresses is proved by the figures of system

punctuality made public recently by this railway. It works an average of 3,400 passenger trains daily, which makes a total, during the nine months from January to September of this year, now under review, of nearly 900,000 trains, covering roughly 35,000,000 miles. Of this immense fleet 99 per cent. achieved punctual arrivals during this period. There was only one month during which the sequence was interrupted. This was February, when record-breaking temperatures below zero were accompanied by exceptional snowfall and long-continued storms. The astonishing feature of the February figures is, not that they show a fall below the normal 99 per cent. punctuality, but that it was found possible, in the conditions described, to keep the punctuality percentage up to 96.6 per cent. Even the heavy summer traffic to and from the Atlantic coast appears to have had but little effect on the records.

* * * *

Damas-Hamah Railway Results in 1933

During the year 1933 the Chemin de fer du Damas-Hamah et Prolongements carried 674,998 passengers and 405,246 tons of goods, the total receipts in francs being 22,187,497. These receipts are some four million francs less than those for 1932. Passenger traffic has fallen by nearly 30 per cent., but goods traffic has increased by nearly 300,000 tons over 1931. Total receipts for 1932 were fr. 26,227,641 which shows a reduction of fr. 12,326,246 compared with 1931. Very slight compensation for this reduction was made by lowering the working expenses in 1932 to fr. 27,188,432 as against fr. 29,752,396 in 1931. The economic crisis and increasing road motor competition are stated to be responsible for the deficits shown and, although tariffs were reduced in an attempt to meet road competition, the result hoped for was not achieved. Better results are anticipated to be shown by the figures for 1934, since the railway has secured control of Auto-Routière, the principal motor carrying concern. In order to provide fast passenger services the railway administration obtained from French builders two diesel-mechanical railcars of 210 b.h.p., which are destined to run between Aleppo and the coast at Tripoli, and in conjunction with two more cars on order these should further improve the 1935 position.

* * * *

Routes to Duty for Fogmen

In reporting on a fatal accident to a permanent way man on January 24 last, Mr. J. L. M. Moore concludes by recommending that "each fogman should be made conversant with the safest route to his fog post and urged to use it on all possible occasions, so that he may become thoroughly conversant with it and reasonably certain of being able to find it under the worst conditions." On the occasion under review, the fog was so dense that visibility was practically nil at 9 p.m. The man was about to perform duties that he had carried out for the last four years, but to take up his post he had to walk 600 yards from the station to the signal box concerned. Failing to find the footpath leading to a subway under the tracks, owing to the dense fog, he returned to the station and started off to walk along the line, following the course he was well acquainted with through his ordinary work. At first there was a ten-foot clearance between the tracks, but this gradually narrowed, and on reaching a point some 300 yards from the station, where there was a space of only 7 ft. 4 in., he was overtaken by a train, knocked down and so seriously injured that he died the next day. Mr. Moore, before making the recommendation quoted above, said that if the man had always gone by the road when taking up his fogging duties, he would have become familiar with it when conditions were not

so abnormal and in all probability would have been able to find it in this instance.

* * *

Indian Bazaar Trains for British Exhibits

The Indian State Railways are to be congratulated upon the new facilities they are now providing for British trade in India, as outlined in the news columns of our issue of December 14. The exhibition train tours will enable British enterprise to step on to ground hitherto sacred to Indian trade, and display the advantages of British materials, workmanship and ingenuity at the very doors of up-country Indian buyers, just as easily as the Indian *box-walla*. For the time being the tours will be confined to broad gauge systems, but if they prove sufficiently successful, a metre gauge train also may be equipped, though practically all important centres of trade are served by 5 ft. 6 in. gauge lines. The proposed charges for show space are said to be very reasonable and retail sales are, it is understood, to be permitted. Trade associations and groups of manufacturers and exporters will have an opportunity of exhibiting representative samples and products throughout the industrial centres of India in circumstances never before obtaining, and there should be keen competition among them for the limited number of stands available.

* * *

Workshop Accidents in Germany

For some time past there has been a Safety First movement in Germany, the activities of which have, of course, been extended to the railway service, where they have received plenty of encouragement. In a recent issue of *Die Reichsbahn*, Dr. Hans A. Martens, at one time a frequent writer on signalling subjects and of late years associated with the accident prevention movement, supplies some interesting information on how conditions have been improved in the last six or seven years, based on statistics compiled by the Berlin Divisional Management, which deals with those relating to accidents in the railway workshops. In 1927 there were 16,516 accidents, or 16.2 per hundred employees and 66.1 per million hours of work done. In 1932 the accidents numbered 4,298 and the constants were 5.7 and 28.7 respectively. In 1933 there was a further small decrease and there were only 6 fatal accidents in that year. The great improvement realised in six years is apparent and is attributable to the energetic campaign with warnings, placards, lectures and other media conducted by Dr. Martens and his colleagues. Mixed repair shops show worse figures than those where locomotives only, or wagons only, are dealt with. Permanent way shops show badly in comparison with others. The repair works at Eberswalde did best of all in 1933 with only 2.1 accidents per 100 employees.

* * *

A Motor Trolley Fatal Collision

Ganger Samuel Thomas, stationed at Llanpumpaint, was in charge of the section between Abergwili and Pen-cader, on which length there are three stations—Bronwydd Arms, Conwil and Llanpumpaint. On the morning of Wednesday, June 20, a train-letter was sent to Thomas instructing him to book his men on earlier the following day and to travel to Bronwydd Arms to join two other gangs, under ganger Isaac Morgans, with the ballast train, to load up some rails lying between that station and Conwil. The ganger apparently did not get the message until the men came to work at 7 o'clock, and they started on the motor trolley at 7.40, arriving at Conwil at 7.50. The ballast train got on the job at about the same time

and, as Morgans could not begin work until ganger Thomas and his men arrived, and knowing, too, that as he had the staff the motor trolley could not leave Conwil, he had the ballast engine detached and sent forward to bring the men. Unfortunately, ganger Thomas, possibly owing to anxiety due to his being late, ventured into the Conwil-Bronwydd Arms section without the staff or an occupation key, but failed to act to the rule that, under those conditions, a flagman should be sent in advance of the motor trolley. The result was that the ballast engine ran down the motor trolley, and the ganger, who was driving, was killed. Colonel Woodhouse inquired into the accident and we summarise his report on a later page.

* * *

Protecting Trains from Obstructions

In country where railways pass through deep rock cuttings from which falls are liable to take place, constant vigilance is required so that traffic can be stopped in the event of the track becoming obstructed. In some places automatic devices are used, as on the Callander and Oban section of the L.M.S.R. where, through the Pass of Brander, for example, wires are stretched along the toe of the cutting. Any fall of rock must strike these wires, which then automatically set adjoining signals to danger. The Pennsylvania Railroad has now completed the erection of a fence 1,000 ft. long and 40 ft. high in the deep rock cutting at Conewago, just west of Elizabethtown, through which main line high speed trains are operated. The fence consists of 6-in. mesh galvanised wire and is electrically connected to the automatic signals. This fence is of such substantial construction that it can hold rocks or other material of considerable size and weight without their falling on to the track, yet it is not intended only as a barrier. Objects striking it anywhere in its length release a small trigger which sets the signals at danger via the track circuits. A similar action takes place if the fence is broken by an exceptionally heavy fall, so that drivers have ample warning to stop and investigate on approaching the danger zone.

* * *

Locomotive Smoke Deflection

A bulletin prepared under the auspices of the National Research Laboratories, Ottawa, refers to the subject of locomotive smoke deflection and air resistance. In recent years, it states, sporadic and inadequate attempts have been made to secure better smoke deflection, but no scheme has been sufficiently successful to merit general adoption. Information as to the results obtained in Europe from the use of smoke deflecting side plates have apparently not been sufficiently convincing for their adoption in America, and experiments with smoke deflectors on the chimney have not given satisfactory results. Wind tunnel tests show that the entire upper surface of a modern locomotive is shrouded in eddies due to poor aerodynamic design. These eddies trap the smoke, which is then dissipated comparatively slowly, the reason being that the eddies considerably reduce the average air velocity over the boiler. This retardation of the flow adjacent to the boiler is enhanced by the crude shape of the boiler front. Whilst the locomotive has only about 30 per cent. of the total air resistance of the train, and whilst air resistance at low or medium speeds is small in comparison with other resistances, it is to be borne in mind that air resistance increases as the square of the speed, while other resistances rise only as some power of the speed less than unity, making it evident that in high speed passenger services the reduction of air resistance merits attention.

Art and the Railway Station

IN a recent issue of our contemporary, *Building*, Mr. John Gloag administered timely first aid to those who find themselves temporarily stunned by modern architecture. Since the art is one which is already affecting the appearance of our railway stations, it will be worth while to follow his argument here, for, unless founded upon reason, admiration of what is novel may evaporate into reaction as suddenly as it arises. We are told that beauty is in the eye of the beholder, whence it may be deduced that the perception thereof depends upon the beholder's environment and mental attitude. The Victorians did not indulge in arches and excrescences in their station buildings because they were perverse and old-fashioned, but because they liked to be reminded of "Idylls of the King," of "Marmion," and perhaps of "Alice in Wonderland." As Mr. Gloag says, "the architecture of the railways was conceived in a romantic age," and his argument was emphasised by the views of stations we reproduce on page 1061. The façade at Sheffield, no doubt, struck beholders who turned for intellectual recreation to the Middle Ages as beautiful, just as the exterior of Enfield West would have been derided as uninspired. Today, we shrug our shoulders at Sheffield because we can no longer alarm ourselves pleasantly with the notion of an ogre or dragon issuing from its mysterious vaults, but in Enfield we see reflected with infinite satisfaction our own swift logic and controlled energy.

"The world is crazy for speed, and streamlining suggests speed; there is also the vogue for functionalism in design; and these two modern phenomena combine and find their joint expression in streamlining." Here Mr. Gloag sounds a warning note. A craze is essentially impermanent, vanishing as soon as its object becomes commonplace. Is speed really the best theme to express in the architecture of today? The so-called craze for speed is often a form of self-flagellation. Life moves too fast for many of us, but what cannot be cured must be endured. Consequently a melancholy satisfaction is found in the contemplation of our own heroic discomfort. We do not for a moment dispute that architecture must move with the times, but in so doing it would seem desirable to elaborate some aspect of contemporary civilisation which will be of permanent significance and value, and not one liable to be smiled at in a few generations as we smile today at the turgid romanticism of Victorian England.

The doctrine of functionalism requires to be approached with similar caution. If function dictates form, and fulfilment of purpose creates beauty, a functionalist of simple tastes, in a country of equable climate, might live in a barrel with every æsthetic satisfaction. Nature provided the giraffe with a long neck so that it could enjoy the fruits of trees, but the creature is not beautiful in consequence of the ease with which it eats. London Transport capped Osterley station with a towering functionalist lighthouse which would have been roundly condemned had it merely expressed the board's determination to proceed, in the words of Mr. Ramsay MacDonald, "up and up and up." But because it guides the steps of the benighted wayfarer it is presumably lovely by functionalist standards. A railway station, however, is not merely a place for getting in and out of trains. Like the motorcar in one of Mr. Hilaire Belloc's "Cautionary Tales," it is "designed to captivate and charm much rather than to rouse alarm." Over-starkness may congeal the heart in the breast and the money in the pocket of the traveller.

The brighter railway station movement is wisely concentrating upon striking a happy medium of adornment in simplicity. In addition to structural alterations such as

those at Harrogate described and illustrated in our issue of August 17, repainting in schemes based upon modern theories of colour blending is part of the L.N.E.R. programme for 1935. The success with which earlier applications of the plan have been attended is proof that there was permanent merit in the later railway architecture of the last century, the reputation of which has suffered partly from the dinginess into which it was at one period allowed to lapse. The station buildings of the late North Eastern Railway, for example, were of particularly pleasing design and have already lent themselves well to the brightening process. Hull and Durham now have green as their predominant colour and the dignity of the new station at York is enhanced by the use of royal blue. Farther south, Peterborough has acquired a livery of cream walls, brick-red window arches and green pillars. In London, King's Cross, Marylebone, and the west side of Liverpool Street are down for repainting in 1935. Other stations in the programme are Brightlingsea, Hitchin, Hunstanton, Harrogate (the decoration of which was not provided for in the reconstruction programme), Newcastle, Scarborough, and Wolferton. The last named will be decorated in a scheme similar to that already applied at Ballater. It is too much to expect that every one of so varied a selection will benefit to a like extent, for not all old stations lend themselves to being kept clean. Where colour is discreetly applied to the airy and practical buildings of to-day, however, the results should be a genial atmosphere and an increase of patronage.

* * * *

Standard or Zone Time

FIFTY years ago a revolution intimately concerning the usages of all the millions of people in North America and Europe was effected with so little disturbance of daily life that comparatively few were aware of it until it was an accomplished fact. The change involved was the adoption of what was officially designated the "universal day," signifying the adoption of an agreed basis of standard time, reckoning by Greenwich. It was on December 31, 1884, that the Astronomer Royal of Great Britain gave the plan his official benediction, so rounding off the operation and enabling settled order to be substituted for conditions which were in some respects extraordinarily chaotic. The custom previously was for each town or village to keep its own time, which was regulated more or less by the position of the sun in the sky. The rude sun dials which are still to be seen on many country churches served to keep the village clocks in tolerable agreement with the sun, providing a rough and ready means of regulating the hours of labour, meals and sleep. Not until railway travel accentuated the discrepancies and produced complications with which it was found increasingly difficult to cope, did the question of uniformity in time calculation demand international attention.

It is well known that a traveller sees the sun cross the meridian progressively earlier as he goes eastward, or later if journeying to the west. Narrowed down to a rail journey from Paris to Berlin and vice versa, the speed of the train being the same in each direction, and local time being kept at each station, the difference between the eastward and westward trips would be one and a half hours. The Germans adopted a local time system of their own for the regulation of train services, posts being fixed along the railways to mark out each minute of difference of time from Berlin. As there was a variation of one minute for every ten miles eastward or westward, the engine drivers and guards were under the necessity of constantly changing their watches. In this

country, time reckoning as applied to railways was simplified by the adoption of Greenwich time, but for some years both the local and the railway times were shown on village clocks, two minute hands being used for the purpose. The dual clock system, however, was by no means successful, and justification for its abandonment was found in the adoption of the "universal day." As mentioned in an editorial note on this subject, in our issue of December 8, 1933, the scheme was originated in Canada by Sir Sandford Fleming, constructor of the Inter-Colonial Railway of Canada, and Engineer-in-Chief of the Canadian Pacific Railway, who first expounded his views in a paper read at a meeting of the Canadian Institute in 1879. He proposed the adoption of a "universal day" commencing at Greenwich mean noon, or at midnight at a place on the ante-meridian of Greenwich, the day to coincide with the Greenwich astronomical day instead of the Greenwich civil day favoured in the United Kingdom.

The next move came from the American Meteorological Society the following year. There were in the United States at this period no fewer than 75 different local times, and the society recommended as a provisional measure of unification that the number be restricted to five, these to be 4, 5, 6, 7 and 8 hours respectively later than Greenwich. The suggestion was that the way should thus be paved for the application of a common standard of time to the entire railway and telegraphic services throughout the whole North American continent, the basis proposed being the time of the meridian six hours west of Greenwich. Progress was rendered easy by the co-operation of the United States General Railway Time Convention, and by October, 1884, the five standard times were not only in operation on 97½ per cent. of the total mileage of the United States railways, but had been adopted by nearly 85 per cent. of the towns of over 10,000 inhabitants within the radius of the services. Meanwhile, discussions in Europe prepared the ground for a special conference at Washington in October, 1884, to fix on a standard meridian for time reckoning throughout the globe. The verdict of the conference was decisively cast in favour of the adoption of the meridian of Greenwich as the zero for longitude, and of the Greenwich civil day, beginning at Greenwich midnight, and reckoned from 0 to 24 hours, as the standard for time reckoning. The plan of making the world day coincide with the Greenwich civil day has had the effect of fixing the change of date at the beginning of a new day in the hours of night throughout Europe, Africa, and Asia, instead of in business hours.

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French Railway Signalling

THE Lagny collision of Christmas, 1933, led to a great deal of discussion, much of which was deplorably ill-informed, on the subject of French signalling. The general question of safety on the French railways was discussed by us in an editorial article in THE RAILWAY GAZETTE for January 5, 1934, and we had also referred to the matter previously in our issue of November 4, 1932. We are now able in the present issue to describe the general principles of signalling and block working in use on the great French main line railways, which we think will serve to demonstrate that any accusation of backwardness in the vital matter of safe working in France is quite unjustified. Certain features of French signalling are fairly open to criticism, just as in this country there are methods which admittedly might be improved. In each case the reason for the persistence of such methods may be traced to financial stringency, but improvement is always progressing. The use of white lights for the clear indication

in France has long been regarded as unsatisfactory, but a change is about to be made in this respect. On the other hand, French engineers who have for years been accustomed to work their main lines by the electro-semaphore block, or an equally effective block such as is used on the P.L.M., might legitimately express surprise that some of the principal British railways should have so long remained content to use the plain block telegraph without any connection whatever with the outdoor signals.

A certain amount of confusion in comparing British with Continental signalling is liable to arise in consequence of the different meanings attached to technical expressions in different countries. Some Continental engineers, for example, use the term "block system" to mean nothing less than a lock-and-block system. This has led certain British railwaymen to assume that many lines are not worked on the block or space interval system, when in fact they are, but by a simple telegraph block. Any arrangement of apparatus which, if the rules governing it are observed, preserves a definite distance between trains, is necessarily a block system from our point of view. It is easy to understand from this example that unless the effects of the method of working are considered, as well as merely its name, wrong conclusions may be reached. The shapes and colours of the signals used in France, as well as their names, differ in several respects from those to which we in the United Kingdom are accustomed, but their purpose and effect are the same, for the conditions of railway working are fundamentally similar in both countries. Interlocking, block working and point detecting are essentially the same everywhere. They cannot be otherwise, and if well made apparatus is used and sound rules of working enforced, the mere appearance of the signals is of but secondary importance. Continental engineers have in the past often expressed surprise that our distant and stop signals should both have shown red lights; yet we managed to work very well with such an arrangement, and although the yellow light has now been generally adopted here for the cautionary indication of the distant signal, we do not know of any evidence that the railways were less safe formerly than they are at present.

In some matters the French railways have set us an example. One is in the use of track circuiting, not only in conjunction with power and automatic signals, but as a preventive of mistakes in manually signalled areas. The P.L.M., for example, has continuous track circuiting from Paris to Mâcon, a distance of 273 miles, and is extending it daily. On the Est the electro-semaphore block is supplemented by track circuiting for the whole distance of 275 miles from Paris to Belfort, while on the Avricourt main line there are long stretches of automatic signalling which have been in successful operation for many years past. The development of power signalling, too, much of it on the ingenious and effective route-lever principle, has been such that French signal engineers have nothing to fear from a comparison with others in this respect. It is fair to say, indeed, that they have given evidence of more original thought in this department of signalling than those of almost any other country, although curiously enough one of the first suggestions for a route-lever system came from an Englishman, C. E. Carr, in 1889, who appears to have taken out certain patents and then to have lost interest in the matter. In regard to cab signalling, the French have done much towards the development of devices in an admittedly difficult field of technical work. The latest American "code" cab signalling is now being tried and seems likely to find acceptance for certain sections of line. A study of the history of signalling in France and the recent work of signal engineers there must dispel any idea that the safety of the railway passenger is less well cared for across the Channel than it is in Great Britain.

PUBLICATIONS RECEIVED

Handbook of Palestine and Transjordan. Edited by Sir Harry Luke and Edward Keith-Roach. Third edition. London: Macmillan & Co. Ltd. 7½ in. × 4½ in. × 1½ in. 549 pp. Map. Coloured frontispiece. Price 16s. net.—The third issue of this handbook has been revised throughout and partly re-written in order to cover the many developments which have taken place in Palestine and Transjordan during the past four years. Progress and achievements in the economic sphere are not all that has to be chronicled, for the work of archaeologists in recent seasons has further illuminated the ancient history of Palestine. The present edition of the handbook therefore records both a fuller life to-day and a more detailed comprehension of the past in this vitally interesting part of the world.

A geographical and historical section traces the history of the country from Biblical times to its development under the British Mandate. Races, religions, archaeological features and places of interest are dealt with in considerable detail, leading up to the chapters which survey the life and activities of the country at the present time.

Communications and information for tourists have a section to themselves, which includes a short guide to Jerusalem and notes on railway journeys to the principal centres of historic interest. These are excellently arranged, with brief descriptions of the landmarks visible from the train throughout the various excursions. Times are given from the 1934 timetables. Railway connections with the Egyptian State Railways via Kantara and the Suez Canal ferry are also shown.

The mass of information collected in this volume recommends it alike to travellers, residents, and those less fortunately placed people who must perforce study the customs, traditions, and life of Palestine from their own armchairs. A complete index and a folding coloured map in a pocket at the end of the book add to the pleasures of travelling by proxy.

Die Punktweise Geschwindigkeitsbegrenzung bei der Optischen Zugbeeinflussung. (Intermittent Speed Control with the Optical Automatic Train Stop System.) By Dipl.-Ing. Hoffmann, Munich. Reprinted from *Zeitschrift für das gesamte Eisenbahn-Sicherungswesen*. Wielandstrasse 8, Berlin-Friedenau. 12½ in. × 9½ in. 13 pp. No price stated.—The Bäseler-Zeiss optical automatic train control system, which works on the intermittent principle and is being made the subject of further trials on selected sections of the German State Railway, provides not only the ordinary permissive and absolute stop action at distant and home signals, but also a number of intermediate speed control effects designed to bring a train to a stand before passing the home signal, or at

least within a much shorter overlap with a plain train stop. This principle is, of course, not peculiar to the optical system, for graded speed control has been proposed, and in some measure provided, with other types, so that a theoretical discussion of the question is largely independent of any specific apparatus. It is, however, claimed for the optical system that it possesses great flexibility, and is able to produce many different controls between the track and the moving train. In this article the various operating conditions and requirements are analysed, and the corresponding arrangements of the optical control apparatus discussed with the aid of speed and braking diagrams. Special attention is given to the control of the high speed trains now being introduced on many routes. The essentials of this interesting topic are very clearly handled by the author, who is attached to the Research Department of the Reichsbahn at Munich, directed by Dr. Bäseler himself. Whatever the prospects of a general adoption of automatic train control may be, there is certainly no lack of scientific study, and literature in connection with the subject, upon which much original thought has been bestowed in Germany.

Railway Statistics of the United States of America for the Year Ended December 31, 1933. Prepared by Slason Thompson, Bureau of Railway News and Statistics, Chicago, Ill. Thirty-First Year. 8½ in. × 5½ in. 121 pp. Illus. No price stated.—“Trains passing at 150 m.p.h.” is the dramatic heading to the frontispiece of the present issue of this annual publication. The figure, of course, is the relative speed of the expresses concerned, for the illustration is from the photograph by *The Times*, reproduced with acknowledgment to THE RAILWAY GAZETTE, showing the up and down Flying Scotsmen passing near Thirsk, each travelling at approximately 75 m.p.h. The introductory article complains that the American railways are suffering from a state of emergency which has been overworked by the powers that be. Although outside intervention may have been necessary to restore the credit of the transport industry when the crisis was at its worst, protracted juggling with rates, fares, and hours of work is no longer justifiable, nor can it restore the healthy condition which can come only through more remunerative traffic. Comparing the manner in which the railway depression has been faced in the United States and in this country, the writer refers to the conciliatory attitude adopted by railway managers here over the question of restoring wage cuts, and quotes in full our editorial remarks in THE RAILWAY GAZETTE of August 17 last on “Peace on the Railways.”

Tables of revenue and expenditure of the American railways from 1913 to

1934, demonstrating what has happened since “the great war and Government control conspired with the Interstate Commerce Commission to bring the railways to the condition of beggary in the marts of the great republic in which they were such potent instruments in the Century of Progress,” conclude a chapter of melancholy history and reflection. Railway equipment mirrors the general depression. Fifty-seven locomotives and six passenger cars built during 1933 are the figures most startling for their lowness. In a more encouraging strain is the table showing progress in converting wooden passenger stock to steel or steel underframe construction, more than three-quarters of the total vehicles owned having been so treated in under twenty-five years.

Notes and statistics on foreign railway operation conclude the book. In this section, mention is made of the rebuilding of the P.O.-Midi Pacific, and readers are referred to the article describing the conversion of one of these engines to the 4-8-0 wheel arrangement which appeared in THE RAILWAY GAZETTE of July 14, 1933.

“Hart” Timber Ready Reckoner. By Alfred F. Hart. Second Edition. London: Stobart & Son, 8-11, Paternoster Row, E.C.4. 8½ in. × 5½ in. 119 pp. Price 7s. 6d. net.—Buyers of timber who are constantly having to calculate the cost of their requirements will welcome this handy little work of reference, as it dispenses with the need for much laborious arithmetic. It shows the value of any part of a Petrograd standard at any price up to £30 a standard, whether the quantity is in quarters, deals and parts, or in decimals. To find the cost of a given quantity of timber, reference is made to the page bearing the same number as the given quantity contains of whole deals. Thus for no standards, two quarters, 5 to 6 deals—65 to 66 deals in all—page 65 is sought.

Drying Plants.—The range of drying equipment described in this booklet, published by James Keith & Blackman Co. Ltd., covers a variety of types that provides for practically all requirements. The apparatus is designed to afford the scientific application of natural drying agents. The manufacturers' well-known fans and blowers are used to create the air draught and heating is by sectional gilled tube radiators or, where no steam is available, by coke-fired air warmers. K-B tunnel driers, in which the articles for treatment are moved by chain conveyors or trolleys against an air current which rises progressively in temperature, have been successfully applied in large numbers to the drying of glues, jellies and plaster slabs. Where progressive drying does not lend itself to the processes involved, compartment and double duct dryers, the latter arranged for independent supplies of warm and cool air, are suitable installations. Nozzle driers for bottles and high-temperature gas driers are also listed.

THE SCRAP HEAP

MOVING DAY

Coming up the moving staircase at Holborn Tube station the other day, I watched a workman changing the posters in the frames that line the passage. He walked steadily downward, keeping pace with the moving stairs, while he deftly opened the frames and changed the posters. Only once was he upset. A group of passengers swept him upwards; but in a few seconds he had raced down again and resumed his treadmill.—From *"The Evening Standard."*

ALTON RAILROAD SIMPLIFIES MENU

In an effort to simplify its menu and thereby make it easy for patrons to select meals, the Alton Railroad has adopted the following form:—

The Alton Railroad Company
DINING CAR DEPARTMENT

Fixed Price 60c Breakfast

—Choose Your Own Assortment—

One choice of any one article in each column

Stewed Prunes with cream	Oatmeal with cream	Omelet as desired	Dry or Buttered Toast
Orange Juice or sliced	Corn Flakes with cream	Horseshoe Cut Ham (1 Egg)	Bran Muffins
Grape Fruit (half)	Puffed Rice with cream	Corned Beef Hash with (1 Egg)	Breakfast Rolls
Cantaloupe (portion)	All Bran with cream	Bacon (3 slices One Egg)	Toasted Whole Wheat Bread
Honey Dew Melon (portion)	Shredded Wheat Biscuit with cream	Roast Beef Hash Southern style	Fried Corn Meal, Mush Maple Syrup
Tomato Juice	Grape Nuts with cream	One Loaf Lamb Chop	Corn Muffins

Choice of Beverage served with each Breakfast

COFFEE ~ TEA ~ MILK

Please write your selections on meal check
for employees guidance

F. A. STINE
Mgr. Dining Car & Comm. Dept.
Baltimore, Md.

Each column on the menu contains the dishes of a course and all the diner has to do is select one dish from each column. The opportunity to select desired combinations of food eliminates the disappointment experienced by the patrons when fixed combinations are shown on the bill of fare.—From the *"Railway Age."*

Hereabouts (in the neighbourhood of Pisa) signs of railway construction become apparent; but such original methods of procedure would have excited the derision of the most saturnine English contractor. The digging was effected by a sort of adze, and the loosened material, lifted deliberately by a long-shanked scoop, was carried away in small baskets on the heads of women and girls. . . . Ordinarily, in constructing our railways, the reasonable plan is pursued of running off truck-loads from the heights to fill up the hollows, but here every spot is made to depend on itself; the

material from the excavations is piled mountain high along the sides of the line by that dreary basket-carrying process; and to form embankments, acres of the adjoining fields are mercilessly stripped of several feet of their soil—the waste of land, the toil, and the stupidity of the whole thing being absolutely pitiable.—From *"Something of Italy,"* by W. Chambers, 1862.

* * *

A correspondent has recently sent us the following rather unusual description of the making of the Lancaster & Carlisle Railway, which appeared in a *"History of Cumberland"* by Mannix and Whellan, published in 1847, a year after the line was opened:—

The Lancaster and Carlisle Railway was opened throughout on December 15, 1846, with much éclat. The bill for its construction received the royal assent on June 7, 1844, and the first sod was turned on Shap Fells, on July 18, so that this gigantic work had been accomplished in the short space of two years and five months, at a cost of £1,200,000 or about £17,000 per mile, being somewhat below the original estimate. Its total length is 70 miles, and there is not a tunnel on the line, although it rises at its summit 1,000 ft. above the level of the sea.

The following facts connected with the Lancaster and Carlisle Railway were communicated to the company by Mr. Mould, at the contractor's dinner, on December 16, in the Assembly Room of the Athenæum, Carlisle:—Total quantity of gunpowder used upon the works, 4,133 barrels of 100 lb. per barrel, or 184 tons. Of fuze 61,044 coils, the length of the fuze being about 416 miles. Of rock there were 480,000 cubic yards, independent of 400,000 cubic yards

of *samel* which required blasting. The number of bridges on the line is 219; of viaducts, 5; of culverts, 230; being equal to 5 miles; besides 15 turnpike road bridges and 64 public road bridges. The number of days requisite for the execution of the works was equivalent to the work of three millions of men for one day. It joins the Newcastle and Carlisle Railway at the London Road station, where the line is 36 ft. above the level at Morecambe Bay, and 852 ft. below the Shap Summit. The gradient at Shap Fells is 1 in 75; and this is the highest point on the line, being 888 ft. above the level at Morecambe Bay, and 1,000 ft. above the level of the sea. The length of the cutting is about a mile, and the quantity of material excavated 350,000 cubic ft., one half of which is rock. The engineers of the line were Messrs. Locke and Errington; the resident engineers, Messrs. Larner and Worthington; and the contractors, Messrs. Stephenson, Mackenzie, and Brassey.

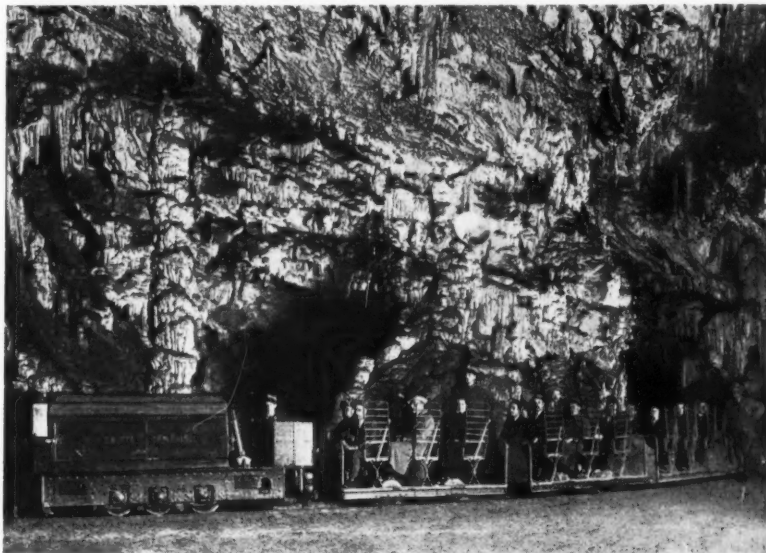
The names of the stations from Carlisle to Lancaster, with the heights of most of them above sea level, are:—

Carlisle	51	Low Gill	560
Brises	162	Oxenholme	—
Southwaite	280	Kendal	292
Plumpton	405	Milnthorpe	101
Penrith	463	Carnforth	32
Clifton	558	Bolton	—
Shap	842	Hest Bank	12
Tebay	560	Lancaster	65

INAPPROPRIATE

Tompkins: "There goes Sir Peregrinus Bottlesholders, General Manager of the railway you abuse so much. Now's your chance."

Simphins: "Excuse me Sir Peregrinus; but I really must protest against the shocking service between — and —. It . . . , but perhaps though, I oughtn't to tackle you personally in the street. Seems rather like stopping the King of Beasts to complain about a caterpillar, doesn't it?"



Novel one-mile 2-ft. gauge railway in the famous grottoes of Postumia, Italy. The rolling stock comprises three petrol-engined tractors and 45 toast-rack trailers

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

Hardinge Bridge protection decision—Financing construction work for New Zealand—Progress of new Italian trunk line—Road concessions for Spanish railway—New South African locomotive on trial—French railway finances—Chinese railway developments—Sir Felix Pole and electrification in Egypt

INDIA

Hardinge Bridge Protection

A further meeting of the committee of experts appointed to review the progress of the protection work at the Hardinge Bridge has recently been held. A full account of these works was recently published in THE RAILWAY GAZETTE. The committee inspected the bridge and the river in August last when the river was in high flood. It was then proposed that the course of the Sara protection bank should be altered and that the Damukdia protection bank should be joined up with the right guide bund. The committee has now decided that this proposal should be the subject of model tests by the Bombay Government Irrigation Research Department at Poona, and that the repairs to the right guide bank should be started immediately; also that more pitching stone should be placed round the piers. The committee consists of Mr. Williamson, Agent, B.N.W. Railway; Mr. B. L. Harvey, Deputy Chief Engineer, E.B. Railway; Mr. Robey, Senior Government Inspector of Railways; Mr. Trench, Chief Engineer, Sind Irrigation; Mr. Curry, Chief Engineer, Bengal Irrigation; and Lt.-Col. Woodhouse, Director of Civil Engineering with the Railway Board. Mr. Inglis, Superintending Engineer in charge of model tests (Bombay), and Mr. Lacey, Superintending Engineer, U.P. Irrigation, also assisted the committee while Mr. Lacey undertook to provide the formulæ to be used in the tests.

NEW ZEALAND

New Line Projected

In the project now being pressed for the completion of the line between Napier and Gisborne along the east coast of the North Island, referred to in THE RAILWAY GAZETTE of November 16, one of the conditions upon which the Government agreed to the handing over of the uncompleted railway to private enterprise was that £500,000 of the money necessary to complete the line should be raised in New Zealand, and the East Coast Railway Committee is now seeking to persuade the Government to withdraw

that condition. In a letter to the Prime Minister (the Rt. Hon. Geo. W. Forbes), the Mayor of Gisborne states that a London group of financiers is, apparently, prepared to find the whole of the necessary money, and to begin the completion of the line almost at once. The group would not find the money, however, if the above condition was insisted upon, for it is felt that apart from the very material delay this would entail, there would be inevitable confusion in drawing up a scheme of financing the work. It is understood that a visiting representative of the financial group has given a more or less definite undertaking that the necessary money will be forthcoming so long as the Government withdraws its condition. A further development in connection with this project is expected shortly.

Bridge Strengthening

Work is in hand at present on strengthening or renewing the girders of the bridges on the Central Otago line between Dunedin and the important fruit-growing and gold mining area of the South Island. Already eight of the bridges constituting the heaviest section of the programme have been completed, and work is proceeding on Flat Stream viaduct. After this, only seven smaller bridges remain to be strengthened before Middlemarch (48 miles from Dunedin) is reached. It is expected that the work will be completed by the end of the present year, and the department then proposes to utilise heavier and more powerful locomotives on the route, with a consequent increase in train loadings. The new steel and concrete bridge over Silverstream, built to replace the old wooden structure, which had been in

use since the opening of the Otago Central line, was recently opened for traffic, and the old bridge is now being dismantled.

Wages Restoration

Part restoration of railwaymen's wages has been made, with back effect from April 1 last. This entails a 5 per cent. increase in salaries and wages, with the result that for the period April 1 to October 13 there has been a decrease in net revenue of £9,903. The Chairman of the Government Railways Board, Mr. H. H. Sterling, estimates, however, that, provided the revenue keeps up as it has been doing during the first portion of the financial year, the net revenue will not only be equal to that of last financial year (viz., £1,085,558), but will also go a long way towards meeting the additional amount required for the increase in salaries and wages, which for the year is estimated at approximately £175,000.

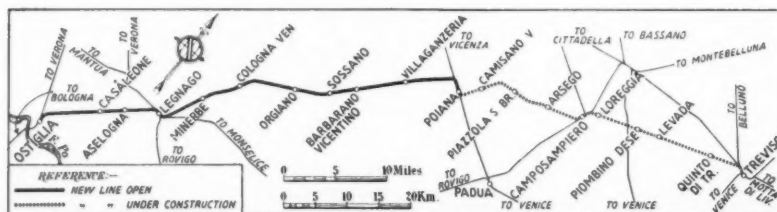
ITALY

New North-Eastern Trunk Line

On October 28 the new State railway from Ostiglia to Legnago was opened for traffic. It is a single line 19.2 km. (12 miles) long, and there are two intermediate stations at Casaleone and Aselogna. Eventually it will form part of the Ostiglia-Treviso trunk line which on completion will have a length of 116.3 km. (72½ miles). The section from Legnago to Poiana has been in service since 1928, and the remaining length from Poiana to Treviso, 49 km. (30½ miles), is under construction and about half completed.

Cheap Return Fare Reductions

Throughout the Fascist Exhibition at Rome, half-fare special return tickets from any part of Italy to Rome were available. The Exhibition closed on October 28, but it was decided to maintain this special reduction in force for another year. The validity of these tickets is, however, subject to the payment of a small tax in favour of certain bodies and organisations who will be arranging festivities and manifestations of various kinds during the year. The tax will be collected by the C.I.T. (Italian Tourist Company) offices in Rome, where the return tickets will have to be presented. The tax varies according to distance from 100 km. (62.137 miles) upwards and to the class,



Plan of Ostiglia-Legnago-Poiana-Treviso through route in north-eastern Italy

from 7 to 25 lire (2s. 5d. to 8s. 7d.) for first-class, 5 to 20 lire (1s. 8d. to 6s. 10d.) for second-class, and 2 to 10 lire (8d. to 3s. 5d.) for third-class. This tax is not likely to affect the sale of these tickets, which are exceptionally cheap, as, e.g., a first-class return Milan-Rome (1,264 km. = 784 miles) via Bologna costs 262 lire (£4 10s. 4d.), second-class 177 lire (£3 1s. 1d.), and 105 lire (£1 16s. 2d.) third-class.

SPAIN

Road and Rail Co-ordination

The *Madrid Gazette* of December 1 contains the first two concessions granted to a railway company for the operation of road motor services where the road is parallel to or competitive with the railway. Under the Decree of July 19 last and the Ministerial Order of September 19 last, railway companies are to have preference in the concession of licences for motor services upon roads parallel to or competitive with the company's lines, and the concessions now granted are in favour of the Northern of Spain Railway Company and entitle them to establish road motor services on the main roads between Madrid and Avila and Saragossa and Huesca. It is known that both the large and small companies in Spain are preparing to take full advantage of the facilities granted under the new Decree.

SOUTH AFRICA

Trial of New 19C Class Branch Line Locomotive

The trial of the first of the 50 new engines of the above class* was carried out on November 21, between Cape Town and Steenbras Siding, at the top of Sir Lowry's Pass. It will be remembered that the engines are of the 4-8-2 type and are designed for service on a 60-lb. rail. Their tractive effort is 33,000 lb. at 75 per cent. boiler pressure, and they are fitted with the R.C. valve gear, a novelty in South Africa.

Built by the North British Locomotive Co. Ltd., to the designs of Mr. A. G. Watson, M.Inst.C.E., M.I.Mech.E., Assistant General Manager (Technical) and Chief Mechanical Engineer of the S.A.R. & H., the engines are of very attractive appearance and excellent workmanship. They are finished in black enamel with red buffer beams and have bands of mirror finish Staybrite steel round the boiler. The leading bogie is spring controlled and is fitted with an oil bath centre, the latter having been introduced by Mr. Watson with remarkable success in a few previous engines, flange wear and bogie repairs generally being almost negligible with this design.

The footplate is carried back right up to the bunker, the rear end being

guarded by a handrail which does not interfere with firing. The enginemmen have thus a comfortable footing and are in no danger should the coupling between engine and tender break. Unusually long springs over the carrier wheels ensure a very comfortable riding cab. Compensation is in two groups, in accordance with Mr. Watson's usual practice. The boiler is of the standard S.A.R. type A1, modified in that steam is taken from it by a collector specially designed after many tests for dealing with bad waters, a steam dome being thus rendered unnecessary.

The engine ran her trials most successfully, being remarkably steady and very easy riding at all speeds up to 53 m.p.h. Speed limits prohibited higher speeds, but it was obvious that at 53 m.p.h. on the straight the engine was not near her maximum speed. The five-chain curves were rounded with ease at the ordinary speed allowed, no tendency to nose or roll being detected. The S.A.R. are to be congratulated on what should be a most useful and economical addition to their fleet.

FRANCE

Financing of Railways

During the year 1935, the French railways will continue to cover their financial requirements by floating large issues of debentures. The Finance Committee of the Chamber has authorised the issue of a maximum amount of 5,216,000,000 fr. (£65,200,000 at 80 fr. to the £). Of this amount 3,555,000,000 fr. (£44,437,500) will be devoted to covering the operating deficit of 1934. The remainder will be applied to current expenditure, including 414,000,000 fr. (£5,175,000) for rolling stock and 325,000,000 fr. (£4,062,500) for other material.

In the budget debate, M. Germain-Martin, Minister of Finance, gave some figures relative to the financial situation of the railways. He said that the outstanding capital shares of the railway companies total 880,000,000 fr. (£11,000,000). The debenture debt amounts to 62,000,000,000 fr. (£775,000,000). Of this amount, 17,000,000,000 fr. (£212,500,000) of debentures had been issued to cover the railway deficit in the years 1921 to 1925 and 1930 to 1934. The annual interest charges on the debenture debt amount to 4,000,000,000 fr. (£50,000,000), of which 1,000,000,000 fr. (£12,500,000) goes to the deficit service. The Minister added that the growth of the railway debt constitutes a serious danger to the national finances, especially by its effect on the market for Government funds. While expecting much from the rail and road co-ordination, he had no illusions on the subject. He hoped that a solution would be reached and said it was the duty of the Government to try to avert the danger.

THE FAR EAST

New Railway in Anhui

Train service on the Wuhu-Tunki Railway, in southern Anhui, was begun on November 1. This line is part of the projected south-eastern railway linking up Nanking with Shao-an.

Changtien-Poshan Railway

In view of the importance of the Changtien-Poshan light railway, in north-eastern Shantung, for the development of the coal industry and the general prosperity of Shantung province, there is a proposal that the Kiaochow-Tsinan Railway may purchase the line.

Lung-Hai Railway Main Line Extension

January 1, 1935, has been fixed by the Lung-Hai Railway administration as the date for the inauguration of its western extension between Tungkuang, in eastern Shensi, and Sian, the provincial capital of Shensi. Train service on the extension is already being operated as far as Lengchow, 30 miles east of Sian. Special efforts are being made by the administration to complete all engineering work along the new section by the end of the year.

Growing Export Traffic over the Lung-Hai Railway via Lienyunkang

Earnings from freight service on the Lung-Hai Railway have steadily increased since the opening of a wharf at the port of Lienyunkang, the eastern terminus of the railway, in north-eastern Kiangsu. During October over 10,000 tons of native goods were transported over the line for export; goods imported through the port totalled approximately 2,000 tons. Further business is anticipated as another new wharf was to have been ready for use at the end of October.

EGYPT

Invitation to Sir Felix Pole

The Egyptian Railway Board has extended an invitation to Sir Felix Pole, late General Manager of the Great Western Railway, and present Chairman of Associated Electrical Industries Limited, to spend a few days in Egypt early next year to inspect and report on the Mechanical Department and other works of the Egyptian State Railways. This is in addition to his visit to the Palestine Railways mentioned in THE RAILWAY GAZETTE of December 7.

Funds for Electrification

The budget for the year 1934/1935 contains an item of £E10,000 as first instalment of the funds necessary for the electrification of the Helouan line of the State Railways. The Railway Board recently decided to proceed with the work, and a committee was formed to formulate the scheme.

* These engines were illustrated and described in THE RAILWAY GAZETTE of November 16.—ED. R.G.

GERMAN RAILWAY DEVELOPMENT PROGRAMME

In a recent address at the Hanover University Association, Dr. Dorpmüller, General Manager of the German State Railway, gave a summary of German railway developments in the near future.

Higher Passenger and Goods Train Speeds

The 1934 purchasing programme included 13 double articulated fast railcar units of the Flying Hamburger pattern and four three-car units. Plans for 1935 provide for fast railcar services on the following trunk lines: Berlin-Cologne, Cologne-Hamburg, Berlin-Leipzig, Berlin-Dresden, Berlin-Munich, Berlin-Frankfurt and Berlin-Königsberg. The Frankfurt-Nuremberg and Stuttgart-Nuremberg sections are to be included at a later date. Timetables have already been drafted, according to which it will be possible to leave Berlin in the morning for any of the aforementioned destinations, arriving there between 11.00 a.m. and 1.00 p.m., and to be back in Berlin between 10.00 p.m. and midnight. Travel speeds will vary from 74.5 to 93 m.p.h. with the exception of sections in hilly country, e.g., Frankfurt-Nuremberg and Stuttgart-Nuremberg, where an average of 56 m.p.h. cannot be exceeded. The general increase in speed makes it necessary to divide some of the very heavy express trains, thus raising the frequency of connections.

Faster Goods Trains and Railcars

The speeds of goods trains are to be increased to 43.5-46.0 m.p.h., depending on the type of wagon hauled. Experiments have been conducted since March, 1934, with fast goods trains running between Berlin and Hamburg at a speed of 46.6 m.p.h., and Dr. Dorpmüller stated that the results were an unqualified success. Another series of experiments was started this last summer with goods trains running at 56 m.p.h., but in this case the wagons are of a special type.

As the introduction of fast railcars for the conveyance of passengers curtails the possibilities of carrying express goods, investigations are now being made with a view to operating fast railcars for goods traffic only at a speed of 80 m.p.h. Accelerated local passenger railcar services have been planned, and will be initiated in 1935 in the Ruhr district, the Rhine-Main territory, Saxony and Eastern Prussia.

Permanent Way

It was ascertained that the standard permanent way introduced in 1926, with rails weighing 49 kg. per m. (98.7 lb. per yd.), has given very satisfactory results, and can sustain speeds up to 125 m.p.h. Details, however, have to be improved; thus, transition curves must be lengthened and cants in-

creased, although this cannot always be done to the desired degree on such lines as that bordering the Rhine. The introduction of 30-m. (98.4-ft.) instead of the 15-m. (49.2-ft.) rail length was a great step forward, and experiments will be made to determine whether a broadening of the rail head will further improve the running. The new points with 984, 1,640 and, in a few cases, 3,936 ft. curve radii are also said to have exerted a most beneficial influence on the safety and comfort of running at high speeds.

Bridges, Level Crossings and Signalling

The strengthening of bridges has been carried out in many instances by the use of special high-tensile steel without additional weight. Welded plate girders of 52-m. (170.5 ft.) span have been used on the Rügen dam bridge, and a completely welded 330-ft. lattice girder span will be erected within a short time. A special car with the necessary apparatus for X-ray examination of welds has been evolved. Level crossings, whether guarded or unguarded, are to be made safer by the erection of warning signs. Where barriers are provided, these will be lighted at night by floodlights. Experimental road light signals operated by approaching trains have been installed at about 100 level crossings all over the system. Meanwhile, as described in THE RAILWAY GAZETTE of November 17, 1933, the distance between distant and home signals has been increased to 700 m. = 2,900 ft., and a new type of three-aspect signal, which has for some time been installed on main lines, will be standardised on high-speed sections. Neither of the automatic train control systems now being tested on the German State Railway has yet been finally selected for general use. The inductive system, with which certain important lines are equipped, was described in THE RAILWAY GAZETTE of September 7 last.

Motive Power

Experiments with steam locomotives carrying 853 lb. per sq. in. boiler pressure have been continued, but as this design greatly differs from familiar types, an attempt was made to secure increased fuel economy with standard engines working at 355 lb. per sq. in. pressure. Six new engines and two converted engines of this description are now in service, and the results are understood to be satisfactory. At the same time, in addition to the 4-6-4 type Henschel streamline locomotives, described in THE RAILWAY GAZETTE of January 26 last, Borsig A.G., of Berlin, is building a 4-6-4 3-cylinder streamlined engine for speeds up to 105 m.p.h., and Henschel & Sohn A.G., of Kassel, jointly with Wegmann A.G., of the same city, are designing and building a light high-speed steam

train for a speed of 93 m.p.h. A 4-8-4 type engine, with 10-wheeled tender, designed to develop a speed of 87 m.p.h., is being built for hauling heavy express trains in hilly country, and a 2-8-2 engine running at 56 m.p.h. will serve the same purpose for goods trains. Also, a 2-10-2 goods engine for the same speed has been designed for particularly heavy and fast goods trains.

Meanwhile, M.A.N. A.G., of Nuremberg, is supplying an eight-cylinder super-charging diesel engine for a locomotive developing 1,400 h.p. at one hour's rating.

Electric traction also is to be extended, especially on mountain sections, but it is understood that this is largely a financial question.

Railcar Improvements

In the domain of railcars it has been found necessary to increase engine outputs. The most powerful engines now available develop 410 h.p. Experiments are being conducted to obtain 600 h.p. by adding a super-charging blower driven by an exhaust gas turbine. Hydraulic gears have been evolved up to a transmitting capacity of 600 h.p., and it is stated that the combined features of such gears—low weight, increased working safety and higher total efficiency—make them superior to electric transmission in the hauling of heavy loads.

Rolling Stock

To facilitate the climbing of steep gradients, weights are being reduced by extensive application of welding. The reduction amounts to 25 per cent. in corridor coaches, about 15 per cent. for "semi-fast" bogie stock (*Eilzug-Wagen*) . . . and some 25 per cent. for four-wheeled carriages for slow passenger trains. Special attention is being paid to the relationship between the wheels and rails. Tyres are now turned to a taper of 1 in 40 and 1 in 20 instead of 1 in 20 and 1 in 10, as hitherto, and the rocking that has in the past accompanied high speeds is said to be thereby practically eliminated. A good many carriages and railcars have been equipped with drum brakes in lieu of the conventional block brake.

Rail and Road Co-operation

To speed up the delivery of goods, 1,140 motor lorries were purchased in the autumn of 1933, and instructions for the purchase of another batch of 920 were issued in July, 1934. It is understood that more orders are to follow. Trucks for the conveyance of railway wagons over roads—such as were described in THE RAILWAY GAZETTE of November 24, 1933—are now available in five large cities, and the same facility will be extended to another five in the near future. It appears that this "private siding substitute" enjoys increasing popularity.

CARRIER CURRENT TELEPHONY ON THE L.N.E.R.

Extensions of L.N.E.R. carrier telephony circuits embrace more important centres in the north and provide a system extending from London to Glasgow

IN our issue of May 29, 1931, we described the first carrier current telephone installation working between the Goods Manager's office, York, and the District Goods Manager's office at Newcastle, with Post Office telephone facilities enabling traders in the Newcastle district to communicate with the York Goods Manager's staff. The efficiency and value of this installation has now justified the expense of installing carrier circuits between York and the District Goods Managers' offices at West Hartlepool, Middlesbrough, Hull, and Leeds, a second circuit to Newcastle, and branches from York to London

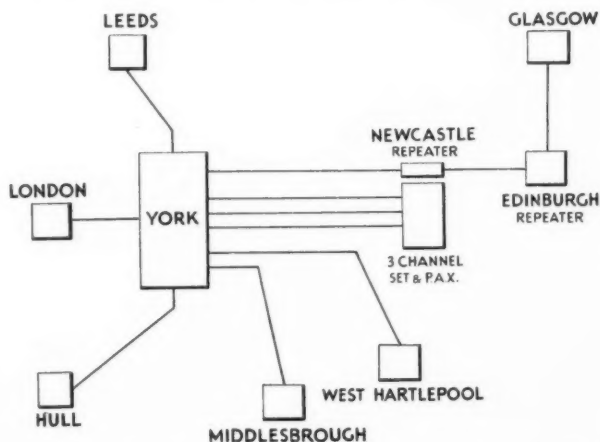


Diagram showing the circuits at present operating in the L.N.E.R. carrier telephone system

and Glasgow. A third circuit is working to Newcastle for the Superintendent's Department and is unusual in that the York office can automatically call or be called by any one of the three offices in Newcastle or an office in Sunderland, via a P.B.X. at Newcastle.

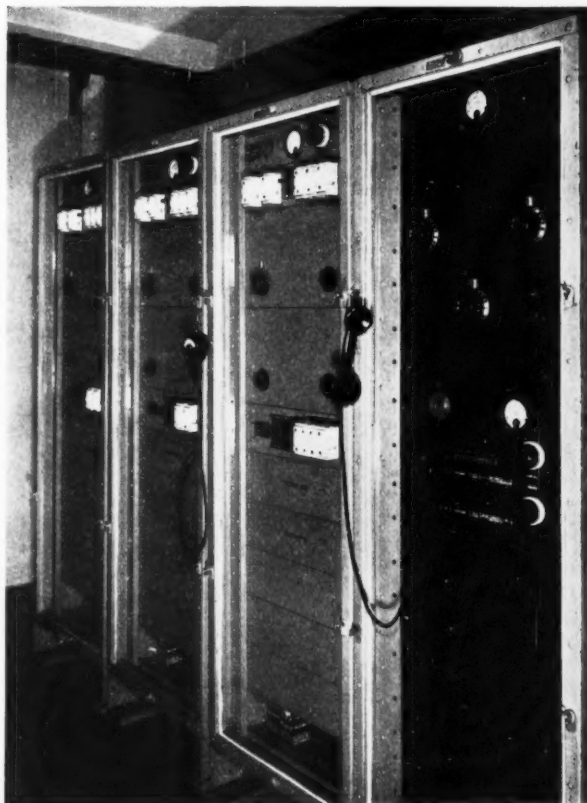
The circuits installed solely for the use of the Commercial Department are primarily intended for the Goods Manager's Rates Section. The Postmaster-General has given permission for traders in the districts served by any of the North Eastern Area circuits to use them for communication with the staff of the Goods Manager's Rates Section at York. Communication can be established on demand, quotations given and any other rates business negotiated. The Commercial Department, through experience with the York-Newcastle circuit, has found that traders greatly appreciate this speedy and efficient method of communication. All this tends to bring traffic to the railways which, in the absence of an efficient telephone system, might travel by other means.

The fundamental principles of carrier current telephony were discussed in our article of May 29, 1931, but certain details of the new installation deserve mention. Multi-channel carrier circuits, mains operated, are used for communication, and the allocation of the carrier frequencies is of interest. Those in use are 7.2, 10.8, 14.4, 18.0, 21.6 and 28.8 kc. The higher group of frequencies, 18.0, 21.6 and 28.8 kc., is employed for the speech transmitted from York, and the lower group, 7.2, 10.8 and 14.4 kc., for

speech received at York, this being one of the terminating points of each circuit. The carrier and one sideband only is transmitted in each case, to permit the transmission of three channels on one pair of wires, the unwanted sideband being removed by an electrical wave filter.

Dryplate rectifiers are used for the modulator and the demodulator; both are linear devices and the modulator is balanced. The dryplate rectifiers of the demodulator are bridge-connected, giving full wave rectification. Signalling for each channel is transmitted by interrupting the carrier at ringing frequency, means of detecting this interruption being part of each carrier receiver.

The scheme was initiated by Mr. Paul Gibb, Goods Manager, L.N.E.R., N.E. Area, York, and the installation and commissioning has been carried out jointly by the staff of the L.N.E.R. and the General Electric Company, manufacturers of the apparatus, under the superintendence of Mr. A. E. Tattersall, Signal and Telegraph Engineer, N.E. Area. Mr. C. J. Brown, Engineer, Southern Area, Mr. W. A. Fraser, Engineer, Scottish Area, and Mr. John Miller, Engineer, North Eastern Area, were responsible for the installations in their respective areas. The contract was carried out under the direction of Mr. Miller.



Carrier telephone room at York. The panels are, from left to right, for the Newcastle "A," Newcastle "B," Newcastle "C" (auto), and Hull circuits

EARLY BRITISH RAILWAY TICKETS

By JOHN PHILLIMORE

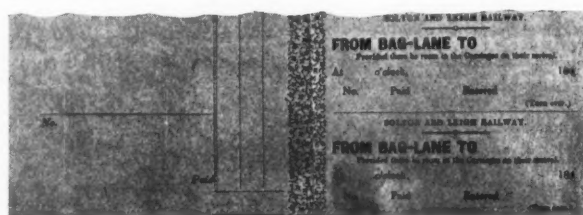
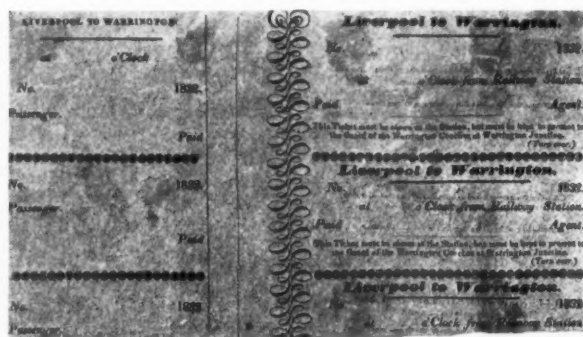
EARLY railway tickets or tokens—like individually named travelling passes or stock and share certificates—appeal for several reasons to collectors of early transport relics, not the least attraction being their comparative rarity owing to the fact that they should have been surrendered after use or period of possession to the railway company. Old certificates were intended for cancellation and destruction, while there existed special machines for smashing ivory passes. That a certain number escaped death by fire, the hammer and other means of destruction, surviving to delight the heart of the collector, is clearly evidenced by the fact that in the writer's collection alone there are nearly fifty named or numbered early railway passes in ivory, mother of pearl, bronze, or silver; while stock and share certificates include those of the Surrey Iron Railway dated 1806, the Severn and Wye of 1811, the Plymouth and Dartmoor of 1821, the Liverpool and Manchester dated 1826, the Direct London and Brighton dated 1836, Rennie's Brighton line adopted later in that year, and so forth. It is, however, to British tickets of fairly early date, and considered as distinct from "passes," that I propose to refer here. The history of the railway ticket is interesting, but can only be touched upon very briefly in this article, the object of which is to mention a few tickets, paper, metal, and cardboard, which are in the writer's collection, and one or two of which are uncommon or rarely seen. During the earliest times the practice prevailing with road coaches was, not unnaturally, continued. A ticket which is illustrated in Tomlinson's "History of the North Eastern Railway" and was issued by the Stockton and Darlington Railway in 1835, shows that it had to be given up to the "engine-man" at the end of the journey. Mostly, however, passengers travelled without tickets and the fares were collected by the guard or the engine-driver. It seems strange to us to-day that no check or even accounts should have been enforced from the start and as a general rule.

The collected fares were known as road-money, which was clearly a survival or continuation of coaching methods. The earliest tickets issued, and this form continued for a number of years, were of paper and like coupons. They were usually coloured, different colours often being used for different classes and on different railways, and they had counterfoils. The tickets and counterfoils, which were printed, were filled in by the clerk in pen and ink, after which the tickets were snipped out of a book, which might contain a thousand forms, with scissors. The system, however, provided little real check, and tickets could be issued without any return being made. An interesting example is a page of unused brown tickets and counterfoils, six in number, inscribed "Liverpool to Warrington." These are dated 1832 and are probably the earliest examples of British railway tickets in existence. That tickets were issued before this however—a fact not generally known—is evidenced by an interesting extract from the Minutes of the Liverpool and Manchester Railway to the effect that on May 27, 1831, the Board decided "that tickets for Newton Races be issued in different colours for different days." I am indebted to Mr. Graham Royde-Smith, Assistant Secretary of the London Midland & Scottish Railway, for having unearthed for me this information and also that relating to L. & M. season tickets.

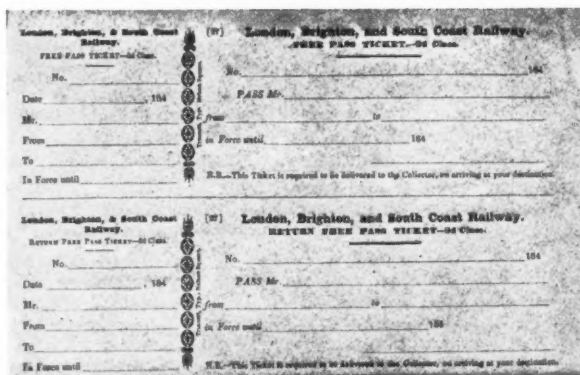
The "Liverpool to Warrington" tickets have printed

on the face: "No. — 1832. — at — o'clock from Railway station. — Agent. Paid —. This ticket must be shown at the station, but must be kept to present to the Guard of the Warrington Coaches at Warrington Junction." On the back of each is: "Notice—No gratuity allowed to be taken by any Guard, Porter, or other Servant of the Company. Smoking in the First Class carriages is strictly prohibited." The second class being open carriages, smoking was presumably allowed, although it was usually prohibited—and for some years after—not only in the trains but in the stations also. The Warrington to Newton Railway—4½ miles long and joining the Liverpool and Manchester—was opened in 1832. It was purchased by the Grand Junction in 1834. The blue paper tickets—eight in one sheet—used on the Bolton and Leigh Railway, a line which, worked partly by locomotives and partly by a fixed engine, was opened on June 13, 1831, have printed on the face, "provided there be room in the carriages on their arrival," and among the regulations on the back is "when seated, please to hold this ticket in readiness till called for, as no person will be permitted to proceed without producing a ticket." These blue coupon tickets were in use between 1840 and 1845.

An example of a white first class paper ticket is a Hull and Selby Railway first class of 1840, the line being open throughout on July 1 of that year. The ticket has the word "UP" horizontally in heavy type at the right-hand side. I only have the bottom ticket from a page and do not know how many made up a page. The footnote on the front reads, "Passengers' Note Books are kept in the Booking Offices at Hull and Selby, in which passengers may enter complaints of incivility or want of attention on the part of any of the Company's servants." Another—to us—delightful sentence in the notes on the back is, "any Passenger riding in a superior Carriage, having paid for an inferior Class only, is liable to a Penalty of 40s."

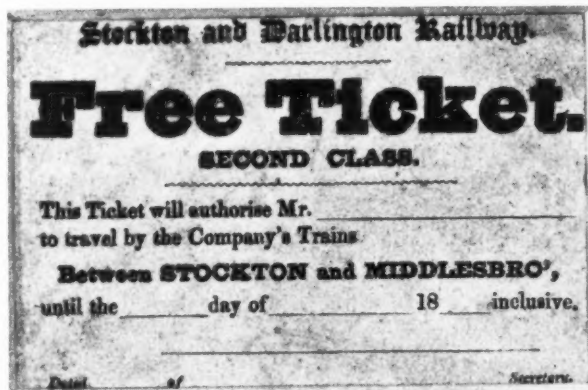


Early paper coupon tickets



A further example of paper coupon tickets, in this case for free passes

The same liability applied to anyone "persisting in smoking." The year—1846—the London Brighton & South Coast Railway was formed of the Croydon and Brighton Railways, the company issued blue paper coupon



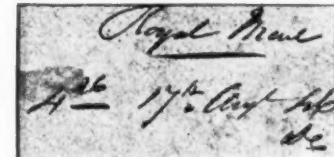
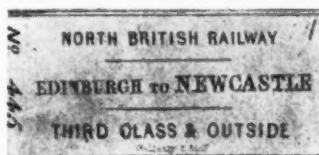
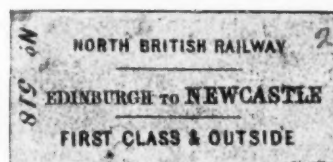
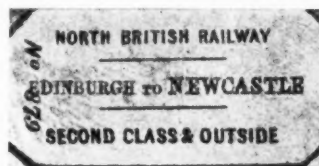
An early Stockton and Darlington Railway free pass

tickets—two on a page—"Return Free Pass Ticket—Second Class." A more modern note was struck in the footnote, which stated that the "ticket is required to be delivered to the Collector . . ." Another "Free Ticket—Second Class," but earlier, is that of the Stockton and Darlington Railway, for use "between Stockton and Middlesbro'." This ticket is much smaller—3½ by 2½ inches—and is not like a coupon. It is pink. The Middlesbrough Branch of the S. & D. was opened January 1, 1831. The early tickets, without date or number, were of a different colour each day of the week, and the guards wore red frock coats with brass buttons. Metal tickets were used, according to the Minutes, on the Middlesbrough branch in 1839. As to "day" tickets, the earliest reference I have is contained in a page advertisement in "The London and Croydon Railway Companion" of 1839. The rarity of this guide, issued the year the line was opened, with its coloured map, time and fare tables, green paper advertisement of the Rotherhithe entrance of the Thames Tunnel being open to the public, and so forth, and such an early mention of day tickets, warrants some quotation. The page is

headed "Day Tickets," and the notice continues, "in order to afford the Public an opportunity of viewing the beautiful scenery upon this Line, more at leisure than the rapid transit of the trains will now permit, the Directors have given orders that Day Tickets shall be issued, which will enable the holders, by paying the fare to Croydon and back, to stop at all or any of the Stations, and proceed by any other train, in which there may be room, to or from Croydon. All the trains will stop at the intermediate stations, viz.: Newcross, Dartmouth Arms, Sydenham, Anerley, near Westow Hill, Norwood, and Jolly Sailor, near Beulah Spa, and that part of Norwood. By order of the Board of Directors, R. S. Young, Secretary. Marquees, &c., are erected in the wood, close to the Anerley Station, and Parties using the Railway will be permitted to angle in the adjacent Canal, which abounds in fish." Return tickets, "to clear the trip both ways," were issued on the Newcastle and North Shields Railway on October 18, 1841, though no reduction was made in the fare.

The cardboard ticket may, I think, be rightly ascribed to Thomas Edmondson, who invented the ingenious ticket dating press when employed at Milton on the Newcastle and Carlisle Railway, and which, by providing a means of printing and issuing cardboard tickets numbered consecutively, furnished a system by which a tally could be easily kept. In August, 1837, Edmondson went one better by bringing out the dating press, the tickets having been previously dated by hand. The arrangement also had the advantage of saving much time and labour. Edmondson went to the Manchester and Leeds Railway in 1839. In 1841, the Great North of England Railway

No. of Ticket	Name	Destination	First Class	Second Class	Third Class	Inside	Outside
587	Mr. Fiddiman		/			/	/
588	Mr. Norton		/			/	/
589	"		/			/	/
590	"		/			/	/
591	"		/			/	/
592	Mr. Powell		/			/	/



The above coach way-bill and railway tickets exemplify the combination of rail and road travel in 1846. Passengers travelled on the North British Railway as far as Berwick and thence by road coach, inside or outside according to the ticket booked

began issuing tickets of cardboard, and other companies then followed suit. In spite of the introduction of more up-to-date methods, we still find in 1846 examples of way-bills and tickets dated, and so forth, by hand, and these are of additional interest to-day, being instances of combined rail and road tickets. The old stage coach guards had way-bills, and the practice survived at any rate until 1854, as it was, I believe, still in force then on the Newcastle and Carlisle Railway. The writer has two complete sets of way-bills and yellow tickets, about two inches long and an inch wide, used by the North British Railway.



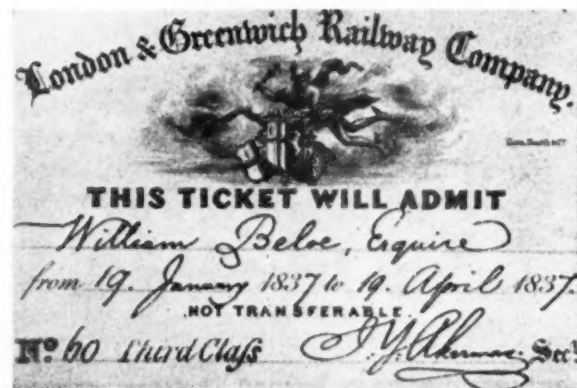
An early London & South Western Railway pass

Both are for the "Magnet Mail" from Edinburgh to Newcastle, and for 11.36 o'clock, the one coach way-bill and its five tickets being for Wednesday, September 16, and the other way-bill with its eleven tickets—including first, second, and third class tickets—for Sunday, September 20. Not only are there headings on the way-bills reading "Inside" and "Outside," but each ticket is printed in red with the class, and "inside" or "outside" as the case may be. The North British Railway between Edinburgh and Berwick was opened on June 18, 1846. The mail-coach service between Edinburgh and Newcastle, after 61 years, ceased on July 5, 1847. The average speed during the last few years had reached 10 miles an hour. Before the opening of the line from Tweedmouth to Newcastle—the Newcastle and Berwick Railway—on July 1, 1847, passengers booking by the North British Railway completed their journey by coach.

We come now to season tickets and, according to the Reverend Reginald B. Fellows, author of the "History of the Canterbury and Whitstable Railway," seasons made their first appearance in 1834, on that line, when, "to meet the wishes of many individuals," the directors in March resolved to issue "Family and Personal tickets for the Season from Lady Day to 1st November. Each Personal ticket 2 guineas, each Family ticket 5 guineas."

The earliest season ticket I know is one I have which was issued by London's first railway—the London and Greenwich—to "William Beloe, Esq., from 19 January, 1837, to 19 April, 1837," a month after the opening from London Bridge to Deptford, the whole line not being completed until December 24, 1838. This cardboard ticket, measuring about 3½ by 2½ inches, is engraved with a fine figure of Mercury and the company's arms and motto. At the bottom appears, "No. 60 Third Class," with J. Y. Akerman's—the Secretary's—signature. The ticket is white, is backed with green cloth, and has a similar face cover. That this series was ahead of its time may be seen from the fact that the Liverpool and Manchester Railway, for example, was not issuing season tickets at that period. The following extract from the meeting of the Directors of the Liverpool and Manchester Railway, held on December 5, 1842, shows the first grant of a season ticket on that line. "Proposal of W. Owen, of Leigh Street, Liverpool, to contract for a conveyance per railway to Rainhill and back six times each week at two-thirds of the sum per annum which the full fares would amount to; which for a second-class fare to Rainhill and back six days in the week would be £31 4s. per annum. One half-year's contract money to be paid in advance. Agreed to." A London & South Western "Free Pass First Class," and dated August 15, 1859, is that issued "Pass Mr. Young and Friend (Press) between London and any station. In force till October 31, 1859." The period is extended—in red ink—till December 31. This white thick paper ticket is signed by the Secretary, L. Crombie, has a fine embossed seal of the company showing an early 2-2-2 engine, and is in a dark red leather case with "L. & S.W.R. Free Ticket" in gold on the front cover. The ticket is numbered 146.

As to metal tickets, the most interesting are those of the London and Greenwich Railway of 1836, and this is perhaps not to be wondered at seeing that the Secretary,



The above season ticket was issued only a month after the opening of the railway, and nearly a year before its completion

Mr. J. Y. Akerman, was a great numismatist and antiquarian. The normal metal ticket was a copper coin—just over one inch in diameter—with the L. and G. arms and a circumscription "London & Greenwich Railway Company" with "London" starting at the bottom on the left. The impression is reversed on the other side. The writer has this also in proof and silvered condition. There was, too, the larger circular ticket—one and a quarter inches in diameter—with a winged horse galloping and a similar circumscription, but with "and" spelt

out in full. The impression is the same way up on both sides. I have one which looks as if it had been under the sea for some years, a proof specimen, and the rare buff cardboard impression. The scarcest ticket of all, however, is probably the slightly smaller type generally similar to the first mentioned with the arms, but with the word "London" starting at the top on the right. This metal ticket may have been found to be rather small and consequently issued for a short time only—hence its great rarity. Ireland's first railway—The Dublin and Kingstown—opened on December 17, 1834, had a small silver "Second Class token" with a quaint view of an early four-wheeled engine with inclined outside cylinders, and "Dublin & Kingstown Railway" round the circumference. I have two specimens, and these show that the obverse—the side with the engine—was stamped from different dies, so that one must be rarer than the other. The engine is slightly larger in one and the ends of the rail adjoin the "B" in Dublin and the "W" in Railway, while on the other they face the "U" and the "A." Lastly, there is the oval brass ticket of the "Newcastle & North Shields and Tynemouth Railway" with the three arms on the obverse. "Third Class" on the reverse, and issued in 1843. I have seen also a rather smaller "Second Class" ticket. The "omnibus Check No. 3" of the "Sheffield and Rotherham Railway, opened October 31, 1838," is fairly well known. In connection with the word ticket, it is



Two early metal passes. That on the right is in silver, and was issued by the Dublin and Kingstown Railway, the centenary of the opening of which was December 17 last

worth noting that some of the earliest certificates were called tickets, such as that of the Severn and Wye, which has engraved on the back the words, "Severn & Wye Railway Ticket."

IMPRESSIONS OF OVERSEAS TRANSPORT

VI—The Continental Limited in the Rocky Mountains. A landslide ahead and a broken bridge in the rear temporarily bar the way

By A. W. ARTHURTON, formerly Secretary, British Railways Press Bureau

AT Watrous (Sask.), 1,766 miles from Montreal, we put our watches back an hour to Mountain time, and experienced the novelty of staying 15 minutes at the station and leaving it 10 minutes before we entered. "And so to bed" for the third night of our long trek across a continent. During the night we pass through Alberta, a fertile province devoted to mixed farming and for that reason more prosperous than those areas occupied solely with wheat raising.

In the morning the *Saskatoon News* awaits us at breakfast, together with a telegraphic bulletin of news from all over the world. This is supplied in the observation car, together with the latest stock quotations, by the Canadian National Railways. From these bulletins we, in the shadow of the Rocky Mountains, learn the latest happenings in the outside world. The sociability and comfort of the observation car are enhanced by the ample supply of English, Canadian and American magazines and a library of books provided by the railway company, and over afternoon tea the occupants of the car get together and compare experiences. Perhaps nowhere else except on a liner does one meet so many interesting people from all over the world. An officer on his way to the East, a professor from an Indian University, a lady teacher from Shanghai, another from New Zealand, a very old lady on her way to California for the winter and a farmer from Alberta are only some of those whom travel and chance draw together.

One lady had been taking a cure for arthritis at the celebrated Dr. Lock's clinic in Ontario and was on her way home to New Zealand. A story she told of the mil-

lionaire doctor is worth repeating. One of his patients was telling him of someone who had come 500 miles for treatment. "That's nothing," said the doctor, "some of my patients come 15,000 miles, where do you come from?" at the same time giving a sudden twist to the patient's foot. "Oh, h——!" roared the man. "Well," said Dr. Lock, "I've had patients from most places but never one from so far away as that."

On entering the Rocky Mountains section at Jasper Park, we again put our watches back an hour to Pacific time, and spend 15 minutes walking round the little town in its Sunday garb, finally leaving at 1.5 p.m., although we did not arrive until 1.50 p.m. This continued gaining of an hour when travelling west is apparently one way of living longer. Jasper is the largest national park in the world, with an area of 4,200 square miles. Within it are a thousand miles of well kept horse trails and a hundred miles of motor roads, a town that is a railway centre, the Canadian and National Hotel, and Jasper Park Lodge with accommodation for 650 guests, the most superb golf course on the continent, and mile upon mile of mountain and forest known only to the bears, the deer and the intrepid mountain men and their ponies.

Then began one of the most wonderful rides it has ever been my fortune to experience. Through the foothills of the mighty Rocky Mountains, up and up, the powerful 4-8-2 locomotive with its heavy load of cars pushes its way, passing rivers, cataracts and torrents, and through snowsheds built to protect the track from the mighty avalanches of snow and debris which hurl themselves down the mountain sides, until we reach Mount

Robson Halt. Here a stop of two minutes is made to view the highest summit of the Rockies, which, however, is clothed in mist as usual and refuses to be viewed. The old Grand Trunk Railway to Prince Rupert branches off and can be seen for many miles far below us. Jasper is, in fact, the apex of the triangle of which the other two points are Vancouver and Prince Rupert. The line to Vancouver which we follow is the old Canadian Northern, subsequently merged with the Grand Trunk and other railways into the Canadian National Railways.

Continuing our 535-mile journey to Vancouver from Mount Robson, we first climb up to the Yellowhead Pass and the Continental Divide. Here, where Alberta touches British Columbia, the rivers are parted, some to travel north to the Arctic, some to drop to the Pacific. Mountains sheer up steeply from both sides of the track—Yellowhead, the Seven Sisters Fitzwilliam and the lesser peaks—and torrents come cascading down the rocks. No railway crosses the Continental Divide at as easy a gradient or as low an altitude. Skirting the four miles of Yellowhead lake we pick up the modest beginnings of the great Fraser river and follow it to Noose lake, passing the fascinating Rainbow Falls on the way. With the Rainbow range on one side and the Selwyn range on the other, and the light blue waters of the lake reflecting them, and with the glaciers sending their cataracts crashing, it is an 8-mile stretch not quickly forgotten.

The route then lies along the wide-spreading Fraser valley, through the valley of the Canoe river and along 175 miles of the North Thompson river to Kamloops. Hell's Gate on the Thompson has to be seen to be appreciated. Eight miles of riotous turbulent water, chained between narrow rock walls, suddenly find freedom. Still more impressive is Hell's Gate in the Fraser canyon. The canyon south of Boston Bar, where the railway strikes it, is 250 ft. deep and at Hell's Gate the waters of the Fraser are forced into a channel only 100 ft. wide, where they lash and swirl with a dizzying speed and terrible force. Standing on the platform at the rear with one of the trainmen, who turns out to be an Englishman, we learn more of this section of the railway—of its beauty in spring and summer and the difficulty of working even one train a day each way in winter, when snowploughs are in frequent request and the snowsheds prove their utility. We were soon to experience some of the difficulties spoken of. Our informant also told us that visitors last summer from Great Britain, Europe and the United States, as well as from Australia and New Zealand, were more numerous than for many years past, as many as 600 or 700 travelling on one train.

The intense cold of these mountain heights and the gathering dusk drove us into the warm, well-lighted car. The snowy peaks on each side were now shrouded in mist, but the Continental Limited, at a very slow speed

and with many creaks and groans from the brakes, reminding one of the rack railways of Switzerland, gradually negotiated the steep falling gradients to Blue River station, where the next stop is made. During the night we were awakened by rocks and stones crashing on the roof and the sound of breaking glass. The engine, too, kept stopping and apparently backing to charge an obstruction. It was then about 2 o'clock in the morning and on enquiry we learnt that owing to the heavy rains slips had occurred at various points and some hundreds of tons of debris blocked the line. The driver consequently backed the train to the first loop with the intention of drawing it back to Kamloops, so as to transfer the passengers to the Canadian Pacific Railway. It was then found that a bridge had been washed away in the rear a few minutes after we had crossed it and progress was barred in both directions. Soon after breakfast a breakdown train arrived on the other side of the bridge and preparations were made to rebuild it. It was found that a mass of mud and stones sliding down the mountain side had literally forced two large iron girders into the river below and had left the track hanging in mid-air. After considerable preliminary work the remainder of the old bridge was blown up and a temporary wooden bridge erected, but although a large gang of men worked upon it all the next night it was not made available for traffic until six o'clock the following morning. In the meantime gangs of men were set to work clearing the obstructions some miles in front of us, but these were not removed until 8 a.m. the following day, when we were able to proceed, with another Continental Limited which had left Montreal a day later than our own, close behind.

Fortunately there were only about 70 passengers on our train, but the problem of feeding them for an extra thirty hours had to be solved and provisions sent up from Vancouver, 170 miles distant. Eventually we reached the coast some 1½ days later, but safe and thankful that it had been no worse. In addition to being on the train five nights from Chicago, we missed the Victoria boat at Vancouver and had to spend another night crossing to Vancouver Island. The journey down to the coast from where the hold-up had taken place was along the magnificent canyon of the Fraser river. The C.N.R. and C.P.R. run along opposite sides of the precipitous gorge, clinging to the mountain on what seems to be a narrow ledge of rock, with tunnels through the more difficult portions. The C.P.R. runs along the left bank and the C.N.R. on the right, and both eventually cross the river almost at the same spot. The Fraser now widens out and runs down to the ocean, large and free, with its strength increased rather than abated, but in a quieter mood. It spreads out and makes way for the shipping at New Westminster. Logs are being towed down the river and industry springs up on every side.

Proposed Mersey Railway Improvements

A proposal is on foot to provide additional accommodation for third class passengers on the Mersey Railway during the morning and evening peak traffic periods. Trains for the heavy traffic periods are at present made up of five cars each 60 ft. long, making a total length of 300 ft., but when the intended alterations are completed trains 360 ft. long, made up of six cars, will be operated. The effect of this will be to increase the third class accommodation per train by nearly 40 per cent.

To enable these longer trains to be used it will be necessary to extend the railway underground at Liverpool Central (Low Level) station by about 120 ft., and to extend the platforms at that station and at Green Lane station, Birkenhead, by 60 ft. Before these works can be carried out, however, it is necessary to obtain an Order authorising the work, and application has been made by the Mersey Railway Company to the Minister of Transport for this Order. Also, additional rolling

stock of the latest type with increased seating capacity will be purchased for making up the longer trains.

This procedure has been rendered necessary by the growth of traffic, particularly during the morning and evening peak periods when large numbers of people travel to and from business under the River Mersey. The provision of longer trains with increased third class accommodation should obviate any congestion and provide for future expansion of traffic. The cost of the whole scheme of new works and additional rolling stock is estimated to be between £20,000 and £25,000.

ART AND THE RAILWAY STATION (See editorial article on page 1048)



Left: Nineteenth century romanticism was somewhat inappropriately reflected in railway architecture. The façade of Sheffield (L.M.S.) suggests the exterior of a mediæval castle rather than a railway station

Right: Modern principles of design ruthlessly eliminate the incongruous. The sober outline of Enfield West is a good example of how harmony is achieved between purpose and appearance



Left: A clash of ideals at Fenchurch Street. The sharply serrated line of the awning is in curious and unfortunate contrast with the classical sweep of the roof

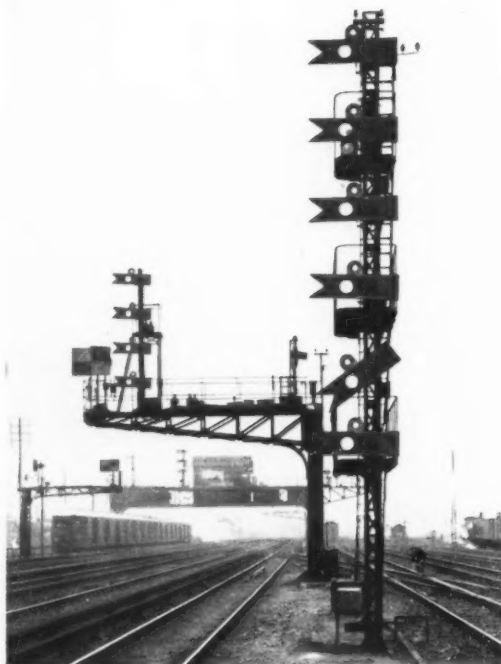


Left: Group of signals near Paris. Block semaphore with distant signal for next semaphore beneath it. Below: a green speed reduction disc and an absolute stop signal. On the right: four-way direction indicator. All these apply to the track below the "Y" sign



Right: Electric colour light signal on the State Railways electrified lines

Lartigue electro-semaphore block post. Normal condition. Just beyond a "palette SEM" repeating the next semaphore



Six-way direction indicator on the State Railways. Behind it a bracket carrying at the outer end a four-way indicator and absolute stop signal. At the inner end a repeater signal in the "off" position. Cab signalling ramp beneath

Lartigue electro-semaphore block post with arm at "stop" protecting a train. The "palette SEM" has been restored to "caution" automatically by the train passing



Cab signalling ramp, or crocodile (left), of the anti-frost pattern, and (right) new blade type as used on the State Railways

SIGNALLING AND BLOCK WORKING IN FRANCE

An account of the principal features of the signal apparatus used on the French railways

THE signalling arrangements on the French railways, although intended to achieve the same general objects as those in use on British railways, differ from them in many respects. This is because different principles of working have been adopted in certain directions and have led to the use of signals and associated apparatus designed on different lines from those familiar to us in this

practice of one line and that of another. This was also increased, as time went on, by the introduction of new signals not mentioned in the code at all.

The disc signals stand at right angles to the line to convey their warning to the driver and are turned parallel to it for "proceed," or are "effaced," as it is termed. They are then practically invisible and exhibit a white



Bridge of signals at Paris, showing, on the left, third line from right, an Aubine treadle

country. As it is always both interesting and instructive to know how other countries operate their railways we are reproducing, by the kindness of several French railway officers, and especially M. Recher, of the Signal Department of the Chemin de fer du Nord, some illustrations of typical signals and signal installations, with explanations of the principal points meriting attention. It must be clearly understood that Alsace-Lorraine is not dealt with in this article, the signalling there being of German type.

Disc Pattern Signals

A peculiarity of French railway signalling is the use of disc, or target, pattern signals for nearly all purposes, semaphore arms being reserved for giving permission to enter a block section or to indicate the direction to be taken at junctions. The earliest use of disc signals in France is believed to have been on the Paris-St. Germain line in 1845. For many years the various railway companies had their own types of signals, but in 1885 a uniform code of indications was laid down by the Government in the hope of securing some degree of standardisation, considered to be most necessary for military reasons. This desirable object was, however, only partially achieved, but a general similarity between the signals of one line and those of another did result, and the position was better than it had been before. Some railways, however, did not make use of all the signals prescribed by the code. This was not contrary to its provisions but it perpetuated a certain lack of uniformity between the

light. Since the line is regarded as being normally clear in France this arrangement is a logical one, but the absence of a positive "proceed" signal is not really satisfactory. This is now generally admitted and, as explained below, a change is to be made in this respect in the near future, at least as regards the night indications.

The principal signals of the disc type are:—

Name	Form	Lights
Absolute stop	Square, red and white chessboard	Two reds, horizontal
Deferred (outer) stop (Not used on the Paris-Orleans Railway)	Round, red	One red
* Distant or repeater ...	Square, green and white chessboard	Two greens, horizontal
* Ditto when not at full distance from the signal it repeats	Green and white chessboard mounted cornerwise	Two greens, vertical
Reduce speed	Round, green	One green
Setting back (P.L.M.), or shunting prohibition (P.O.)	Round, blue	One blue
Absolute stop for sidings (Not used on the Nord)	Square or round, yellow	One yellow

* On some lines (Nord, Etat) these signals are transparencies lighted from behind at night. A signal in the "on" position is said to be "closed" ("fermé") and when in the "off" position, "open" ("ouvert").

The manner of using these signals varies a little as between the different lines. Thus on the Nord the green

and white repeater signal when "on" ("fermé") carries with it a speed reduction over any junction following. It thus exercises the function of the round green disc, placed at a distance in the rear of junctions on the other lines for this purpose. The green disc is little used on the Nord, being seen only at the approach to loops on single lines, or at specially important places as an extra reminder of a low speed reduction, close to the point concerned. The absolute stop signal is used as an interlocking signal at all places where an ordinary stop signal would be used in Great Britain, but it is not allowed to be passed by shunting movements. It is frequently equipped with apparatus keeping detonators on the rail when the signal is "on."

The outer, or deferred, stop signal is used, except on the Paris-Orleans Railway, to protect stations and junctions and is placed at a considerable distance in the rear. It may be passed when "on," but the driver must use every means at his command to bring his train under control and then proceed at such a speed as to be able to pull up within range of vision should an obstruction, or another stop signal, be encountered. In any case he must stop at the first fouling point he reaches, even though all other signals seen are "off," and start again only under the guard's orders. The red disc is followed by a signboard called the "limit of protection post," marking the point beyond which the signal affords efficient protection against an approaching train. On unimportant branch lines this signal is sometimes the only protection provided at stations. On the Paris-Orleans line the outer signals are absolute stop signals. The blue shunting disc calls for no particular comment.

The Aubine Treadle

The outer red discs, and many of the other signals also, are returned to the "on" position automatically when the first wheel of a passing train touches a mechanical disengaging apparatus called, from the name of its inventor, the Aubine treadle. Any signal so reversed can be cleared once more only by the signalman replacing the lever fully to normal and pulling it over. Thus any train arriving at a station or junction automatically protects itself, a safety measure of some importance, seeing that the block system is generally worked on the "stop and proceed" rule, even with manually operated signals.

Direction Indicators

The disc signals do not indicate to a driver the direction set up for his train at a junction save in the case of those ordering a speed reduction, from the position of which the route set up can, of course, sometimes be inferred. They are therefore supplemented by what are called direction indicators or, on the P.L.M., junction semaphores. These consist of fish-tailed semaphore arms, painted violet. For two directions only, a single arm is often used, which points in the direction of the route which is closed at that moment. Two lights appear, one white and the other—on the side of the post where the arm appears—violet. Another arrangement is to mount such arms in the manner once common in England, one above the other, the top arm applying to the most left hand route. In this way any number of routes can be signalled. The arm applying to the route set up is lowered to 45° before, or when, the stop signal is cleared. The latter is placed some distance in the rear of the facing points, as a rule, and extensive use is made of electric locking to hold the road ahead (*enclenchement de transit*) and of electric detection (*contrôle impératif*). For points little used by running movements several types of ground point indicator are seen.

Except in crowded interlocking areas, where block

working is sometimes carried on by means of the ordinary absolute stop signals, it is customary to provide semaphores, controlled in various ways, to govern the use of block sections, especially from station to station on the main lines and at intermediate block posts. When horizontal these semaphores indicate "stop" and exhibit a red and a green light side by side. They are lowered nearly, or in some cases quite, in line with the post to indicate "proceed." The permissive system is generally adopted, under which the signalman can allow a train to enter an occupied section after certain formalities have been complied with.

On some lines, such as the P.L.M., what would be called in Great Britain block instruments are used, interlocked with the semaphore levers. On others, such as the Nord, the block apparatus is of a special kind, unlike anything in this country, and is known as the Lartigue electro-semaphore block. The peculiarity of this system lies in the fact that the semaphores themselves constitute in effect large outdoor block instruments and the signalman has only to manipulate them to carry out the block working, without bell code ringing or other formalities. Another feature of interest is that whereas a signalman places his own semaphore to "danger" when a train passes him, he does not lower it again. The next signalman does that electrically when he clears the section. The block is thus worked on the normally clear principle on double lines. On single lines the Lartigue semaphores stand normally at "danger" and are cleared when permission is given from the far end of the section for a movement to take place.

Operation of Lartigue Block

Electro-mechanical interlocking mechanism is provided to ensure that the signalman shall, by raising the semaphore arm, block the section a train has just entered, before he can clear the section in the rear. At stations special apparatus is installed to enable the stationmaster to cancel this action when absolutely necessary, as in the case of a train being shunted for another one to overtake it. In addition, the distant signal repeating the semaphore, which is invariably placed to "caution" automatically by means of the Aubine treadle, cannot be cleared again until the semaphore has been put to "danger" and electrically dropped once more from the block post in advance. Near the bottom of each post carrying a semaphore, there is a small pointed yellow arm, having no meaning for the driver but indicating to the signalman whether an approaching train is in section or not. Placing a semaphore to "danger" causes the corresponding small arm at the block post in advance to appear from its normally concealed position in line with the post; while concealing the small arm in line with the post causes the semaphore in the rear to fall. At intermediate block cabins the semaphores and arms are worked by handles on the signal post itself, but at other places they are connected by chains and wires to handles in the signal boxes. In such cases the small yellow arms are frequently placed therein also. It must be understood that these signals are block signals only, and have nothing to do with points, for the protection of which the disc type of signal has to be used in addition. On some lines this system of working is completed by the addition of electric treadles, so as to form a complete lock-and-block, or by the installation of track circuit control throughout the section, making it impossible to clear the semaphore in the rear if the section is occupied. This track circuit control is also applied to the P.L.M. type of block instrument which is mechanically interlocked with the signal levers, as with Sykes' system in Great Britain. Although the permissive method of working is allowed on some railways with the Lartigue

block, the length of the block sections is, as a rule, not great, so that the entrance of trains into blocked sections is not of frequent occurrence.

Distant Signals for Block Semaphores

For many years it was the custom on some lines, such as the Nord and P.L.M., to provide an outer red disc in the rear of a block semaphore and keep it at "danger" all the time the semaphore was in the same position. The disc thus acted as a distant signal, as well as an outer signal covering anything stopped at the semaphore itself. The use of the one signal for two distinct purposes had several disadvantages and, if the rules were strictly obeyed, led to many unnecessary stops, with resultant traffic delays. In consequence some railways, including the P.L.M., eventually adopted the green and white repeater signal as a distant signal for a semaphore, as well as for an absolute stop signal. The Nord could not do this without

to some extent on the P.L.M. and the Midi systems before the war. On the Paris Metropolitan Railway automatic signalling has been used from the opening in 1900, first with various treadle systems and now with the latest track circuit equipment, as fully described in THE RAILWAY GAZETTE of November 3, 1933. During the war the Est installed automatic signals to accelerate the traffic on certain routes leading to the front and they have since put in long lengths of automatic signalling, as also has the Midi. Nor have the other lines been backward. The Etat has equipped its busy Paris suburban lines and sections of its main lines. The Orleans, Nord, and P.L.M. have also laid down installations. At first the ordinary signals were used, operated by electric motors, but the more recent installations have been provided with colour light signals. On the Midi, however, the P.D. vane, or banner, type of signal is widely used and this line has adopted the "normal danger" system of control, whereas

the others adhere to the "normal clear."

Electric cartridge-detonating machines are generally installed at automatic signals, causing a loud report to sound if a signal is over-run. When a train has been stopped at a signal so equipped, the guard must prevent the action of the machine by means of a special key before authorising the driver to act on the "stop and proceed" rule. Considerable extensions of automatic signalling are to be made in the near future.

Mechanical Signalling

Allowing for certain differences due to the use of disc pattern signals it may be said that the mechanical signalling in France is very similar to that in this country. Points are generally worked by rodding and signals by the single-wire method, except on the Paris-Orleans Railway where the double-wire system is favoured. A certain amount of wire working for points has, however, been used. The earliest attempts to construct interlocking apparatus in France were made by Vignier, concurrently with Saxby and Austin Chambers in England. The Saxby rocker type of frame with gridiron locking became very popular in France, while for some reason or other the Stevens, or tappet, interlocking was

comparatively little used. In recent years many frames have been constructed with short levers moving through 180°, on the principle long used in Germany, but the gridiron type of locking is still employed, even with them. The French system of signalling, with one stop signal applying to many routes, combined with an extensive use of double slip points, leads to a great deal of conditional locking being required. This is sometimes achieved by adding tappet locking to the gridiron locking. Key interlocking on the Bouré system is also to be found on a large scale, affording a cheap and simple method of locking for the smaller stations. Probably the largest installation ever made anywhere of key locking apparatus was that put in, many years ago, at the Chantilly race station. Wire compensation apparatus is very generally installed and the working of the disc signals is smooth and well regulated at all times.

Power Signalling

Experiments with power signalling were made in France over 45 years ago, at the time when electric light was



Steel signal cabin at St. Denis, near Paris: note bracket posts bringing signals over the line to which they refer

altering all their signalling at junctions for, as already explained, the green and white signal not only repeated a following absolute stop signal but was used by that railway as a speed restricting signal as well.

The Nord therefore adopted an entirely new signal called the "palette SEM," consisting of an arm pivoted in the centre and standing horizontal for "caution" and at 40° for "proceed." The arm carries a row of mirrors, illuminated by a powerful lantern at night, when the driver sees a bar of light, green when the signal is "on" and white when it is "off." Where, however, an absolute stop signal is placed alongside or near the semaphore and has its own green and white repeater this "palette SEM" is not required, for, while the semaphore is at "danger," the signalman maintains the red and white chessboard in that position also. The abolition of the red discs at block posts has greatly improved the working of the traffic. The new signals are automatically reversed by Aubine treadles, in the same manner as the discs used to be, as explained above.

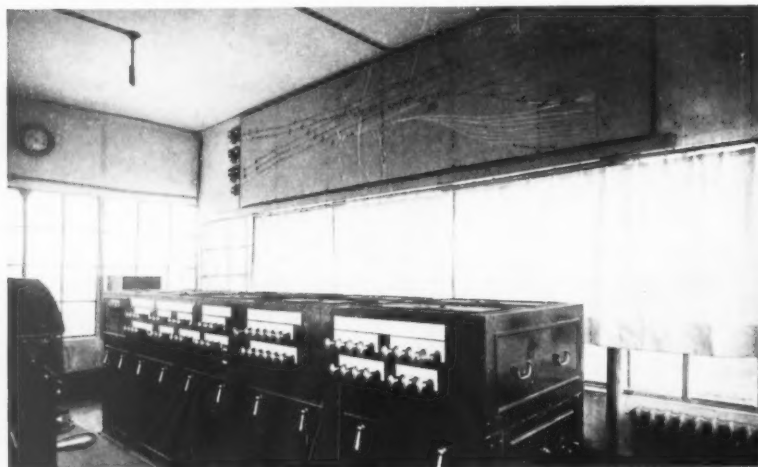
Automatic signalling with track circuit control was used

being put in at some of the principal stations. At first little was done, but eventually several systems were developed, including hydraulic, hydro-pneumatic, electro-pneumatic, all-pneumatic and all-electric. The last mentioned is now the most used. A feature of the development of power signalling in France has been the use of the route lever, or *levier d'itinéraire*, by which the whole of the operations necessary to set the route and clear the signal for a train are accomplished generally by the movement of one lever, or at most two levers.

There are different systems of route-lever working, constructed by the various makers, but the principles are essentially the same in most of them. The leading idea is to simplify the signalman's work by concentrating his attention on the traffic movements to be effected instead of on lever movements, while at the same time reducing the size of the apparatus in the signal-box and accelerating the rate



Interior of cabin at St. Denis. M.D.M. route lever system. On the right the operating handles of the Lartigue block are seen, and above them indicators for the control of the lighting of the signals



Electric signal cabin at Montauban, Midi and Orleans Railways. Bleyrie-Ducouso route lever system

of operation. Two of the largest power signalling installations in Europe, one at the Gare de l'Est, the other at the Gare de Lyon, Paris, are constructed according to the route-lever idea, but on different systems. A description of a recent cabin at Versailles on the State Railways appeared in THE RAILWAY GAZETTE of December 8, 1933. The production of these route-lever systems reflects great credit on French signal engineers, who find it difficult to understand the persistence in individual lever working of their colleagues in other countries.

Centralised Traffic Control

France has the distinction of being the first country on the Continent to have an installation of long distance power signalling on the C.T.C. principle, that between Houilles and Sartrouville on the State Railways, described in our issue of June 8, 1934. This is a natural develop-

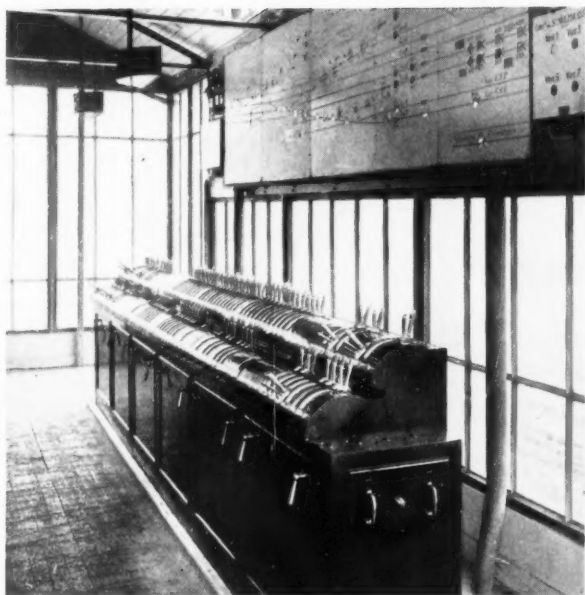
ment arising from the train despatching system, introduced in connection with the movement of American troops during the war and subsequently adopted to a considerable extent by most of the companies and by the State Railways. The installation of C.T.C. above mentioned is under the control of the train despatcher at the Gare St. Lazare, Paris, and was put in to avoid having to instal additional tracks between the stations concerned.

Locomotive Cab Signals and Speed Recorder

For many years past all French locomotives, with the possible exception of a few used only for minor shunting duties, have been fitted with speed recording apparatus, usually of the Flaman type, and this has of late years been combined with electric cab signal mechanism for repeating the condition of certain signals on the locomotive. On the Nord such



Interior of Saxby type mechanical signal cabin. On the left at the end operating handles for Lartigue block semaphores



*Electric cabin signal at Jurisy, Paris-Orleans Railway.
Individual lever system*



*Interior of electro-mechanical signal cabin at St. Lazare,
Paris, State Railways, with point levers moving through 180°*

cab signalling was in use long before the war, but it is only since then that it has come into general operation on all the lines. Many cab signalling appliances have been experimented with from time to time, but the type now generally adopted is derived from the original system of Digney and Forest, first used on the Nord and familiarly known as the "crocodile" apparatus.

Fig. 1 is a diagram of the Flaman speed recorder instrument, above which is seen the alarm whistle of the cab signal equipment and the so-called vigilance handle, with which the driver signifies that he has duly observed an adverse signal. Beneath the speedometer needle is seen

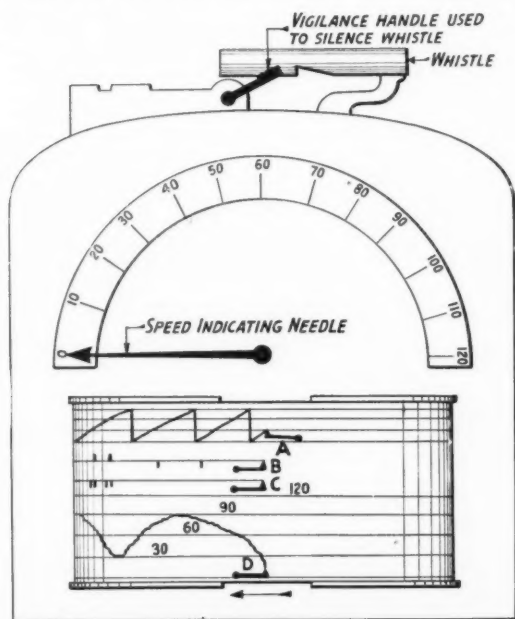


Fig. 1—Speed recorder on locomotive

the paper band on which the record of the journeys is made with the aid of four stylus pens, A, B, C, D. The pen A is moved by clockwork in such a manner as to travel from its lowest position to its highest in ten minutes and then, falling back to zero instantaneously, to make the same movement again. The paper band being stationary when the locomotive is not moving this pen then traces a vertical line. When the locomotive is travelling the vertical lines appear at distances apart proportional to the speed.

The pen B traces a horizontal line, but makes a mark below or above it according to whether a signal encountered is "off" or "on." If the latter, the compressed air whistle on the top of the Flaman apparatus commences to sound. The mechanism for operating this pen and opening the whistle consists of two Hughes electro-magnets, of opposite polarity, connected in series between earth, via the locomotive frame, and an insulated wire brush carried beneath the footplate and arranged to make contact with an insulated ramp—called a "crocodile"—in the centre of the track. This ramp is connected to a battery at the signal through a commutator, so as to be negatively electrified when the signal is "off" and positively when it is "on." Each time a ramp is passed over, therefore, one of the two Hughes electro-magnets releases its armature and, by means of a rocker arm, it imparts a movement in the required direction to the signal recording pen. The Hughes armature is returned to normal by a cam driven from a spindle in the Flaman apparatus, which rotates once for every 48 metres run by the locomotive. Ramps are consequently never spaced closer than 50 metres where combined signals are met with. As a rule the signals repeated on the engine are the red outer discs, distant and slacken speed signals. Stop signals are covered by the detonating apparatus already mentioned.

When the warning whistle has been set in operation it can be silenced only by using the vigilance handle. This, when operated, causes the pen C to make a short vertical mark. The driver is required to actuate the vigilance handle on sighting a signal in the "on" position and then, of course, must do so once more to silence the whistle,

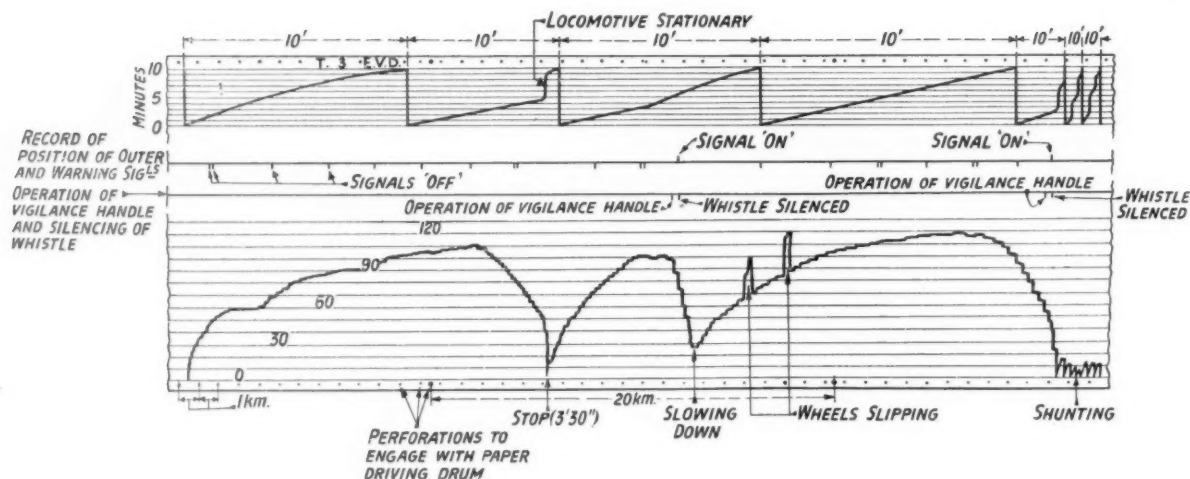


Fig. 2—Record made by Flaman speed indicator

so that two marks made by pen C should always appear when pen B makes one above the line.

The pen D, coupled to the indicating needle, traces a graph corresponding to the speed of the locomotive. It does not move uniformly but at intervals of 4.8 seconds, or $12\frac{1}{2}$ times a minute. The paper band is 35 to 40 metres long, sufficient for a distance of 7,000-8,000 kilometres running. The clockwork re-winds itself automatically while the engine is in motion, but when it is not, requires re-winding by hand after the lapse of an hour.

Fig. 2 shows a typical Flaman band with explanations of the various signs and records. The use of this apparatus, combined with a proper system of examination of the bands after use, enables a check to be kept not only on the observation of the signals, but on that of the speed restrictions also. The apparatus above described is that used by the Nord, but it is typical of the apparatus found on the other lines, such differences as exist being constructional and not affecting the general principles followed.

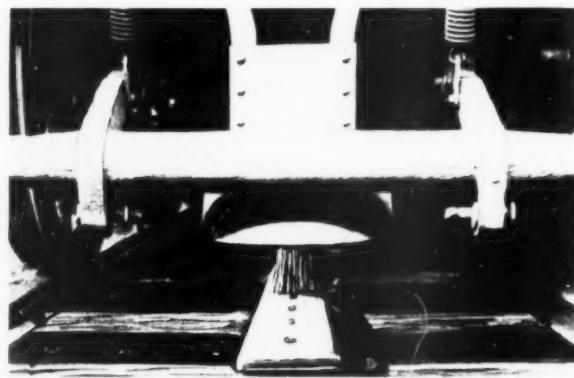
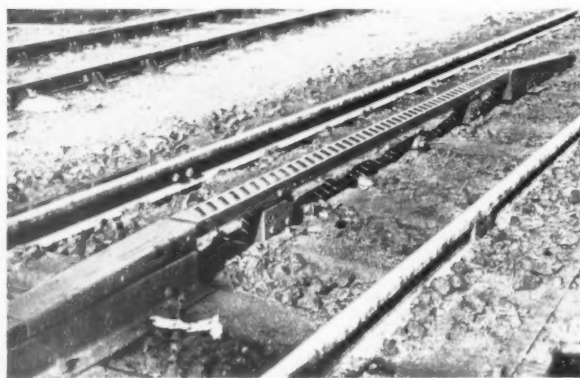
The defect of this cab signalling system is that it operates on the open-circuit principle. In order to reduce to a minimum the risk of failure to make contact with the ramp, due to frost or other unfavourable climatic influences, what are known as "anti-frost" ramps are widely employed. They are constructed on the Colas system. The ramp is really a reservoir containing paraffin oil and is pierced on the upper surface with a series of holes fitted with wicks. The oil slowly spreads over the ramp and prevents the adherence of frost, and the consequent possi-

bility, through temporary insulation, of failure to pick up the current.

Another form of ramp, known as the *louvre crocodile*, is also widely used on certain lines, such as the P.O.-Midi and Alsace-Lorraine, where soft wire brushes are used on the locomotives. In this case the contact face of the ramp is interrupted by a succession of diagonal slots, with sloping faces to their edges, designed to cause the brushes to slide and scrape the various surfaces they touch to the maximum degree, so ensuring reliable contact. Cab signalling has been applied to the distant signals on the A.L. lines since they became French. On the State Railways a ramp composed of closely spaced parallel plates on edge is now much seen.

Continuous Cab Signalling

During the present year trials have been made with the continuous coded system of cab signals on certain sections of line, and it is announced that the State Railways will try it in connection with the installation of track-circuit automatic signalling between Caen and Cherbourg. No mention is made of automatic train control, which is in keeping with the policy generally pursued in France of leaving the control of the brakes in the driver's hands. Even on the Paris Metro, there are no automatic stops. The adoption of continuous cab signalling, which may perhaps become general on the main lines under the new State programme of modernisation of railway equipment, would mark a great step forward from the existing ramp



Louvre pattern crocodile (left), and (right) metal brush beneath locomotive for collecting the cab signalling current

apparatus. There is no doubt, however, that the latter has rendered very effective service in the past.

The Reform of the "Code des Signaux"

From time to time suggestions had been made to make certain reforms in the signalling arrangements in France, but it was not till after the war that the companies, on the advice of a committee presided over by M. Verlant, Traffic Superintendent of the P.L.M., were able to present an agreed programme to the Minister of Public Works, who accepted it officially on August 1, 1930. The principal features of the new code of signal aspects are the following:—

Except in the case of siding signals, where white will be retained, the "proceed" signal will be given by a green light. In consequence yellow will be used for warning indications. A single red light will be shown from semaphores having a permissive feature and two red lights from absolute stop signals, except on sidings where the light will be violet. The disc pattern signals will be altered so that a given shape of disc always conveys a definite meaning, quite apart from its colour, the arrangement selected being as follows:—

Absolute stop signals...	...	Square.
Outer stop signals	Round.
Distant signals	Diamond.
Reduce speed signals...	...	Triangle on its base. At the actual spot where slow running applies there will be an inverted triangle as a reminder signal.

The lights will be modified somewhat, the red disc showing a red and a yellow in future. Distant signals will show a single yellow, speed reduction signals double yellow. The "*palette SEM*" of the Nord (which will be retained on that line) will show a bar of yellow light when "on." At junctions the speed-signalling principle will be adopted and direction indicators will be used only where circumstances render it absolutely necessary. The

arms will be painted bluish white and lunar white lights will be shown. The discs of all warning signals will be coloured yellow. The square stop signals will remain painted as now, save on sidings, where they will be made violet.

Making the Change

Little has been done as yet towards the introduction of the new system of indications, except that here and there, where signals have been renewed or newly installed, they have been so constructed as to be readily modified. It is, however, expected that the work will begin in earnest during the present year. The difficulties of making such a complete change are naturally very great. Isolated signals cannot be altered. A complete stretch of line must be converted to the new system on a given day, to prevent drivers from being confused. The programme proposed is first to replace the present yellow siding stop signals by violet ones, then to change all green warning signals to yellow, and after that to remove green from the block semaphores. During this time white will still be used for "proceed." After a certain time has elapsed green will be substituted for it.

The cost of the alterations, which affect 70,000 signals, was estimated at about £500,000. The fact that the Government has recently authorised the companies to raise special loans indicates that the work of conversion is to be accelerated and that the time required to make the change, originally estimated at three to five years, will be reduced. The present German signalling in Alsace-Lorraine will be modified to some extent to make it harmonise with that used elsewhere in France. As green and yellow lights are already in use in those provinces the changes will not be very difficult to make.

The photographs accompanying this article illustrate most of the various kinds of signal now in use as well as some signal cabins, which, it is hoped, will enable the the above explanations to be understood.

The Accelerated Côte D'Azur Pullman

Opportunity has been taken, in the customary reintroduction, from December 14, of the Côte d'Azur Pullman express for the winter, still further to reduce the overall times of that famous train. Owing to the retention during the winter service of the 8.10 a.m. *rapide* from Paris to Marseilles and the Riviera, the P.L.M. authorities have altered the departure time of the Côte d'Azur from last winter's 8.15 a.m. to 10.15 a.m. The run of 96.2 miles from Paris to Laroche is scheduled in 94 min.; from there over Blaisy-Bas summit to Dijon the time allowed for 99.0 miles is 101 min.; and the 122.1 miles from Dijon to Lyons, including the dead slowing through Chalon, are allowed 117 min. These start-to-stop averages of 61.4, 58.8, and 62.6 m.p.h. respectively bring the train into Lyons (Perrache) at 3.35 p.m., the time for the 317.3 miles being thus 320 min., inclusive of two stops, or only 30 min. more than that of the Bugatti railcar service at 8 a.m. from Paris. After Lyons, the 65.8 miles to Valence, on sections of which the execution of engineering works necessitates slow running, take 74 min., the 77

miles thence to Avignon, 71 min. (= 65.1 m.p.h.), and the 75.3 miles from Avignon to Marseilles, 79 min. Marseilles, 535.3 miles from Paris, is attained in the hitherto unprecedented time of 9½ hr., and the average overall speed, including five intermediate stops, is 57.9 m.p.h. Thus Marseilles is reached at 7.30 p.m., Toulon at 8.30 p.m., Cannes at 10.6 p.m., Nice at 10.35 p.m., Monte Carlo at 11.5 p.m., and Mentone at 11.15 p.m. To Nice the time of 12 hr. 20 min. gives an overall average of 54.7 m.p.h. for the 675 miles—a remarkable figure, in view of the heavy gradients along the east of Marseilles.

In the reverse direction, the Côte d'Azur Pullman leaves Mentone at 9.20 a.m., Monte Carlo at 9.30 a.m., Nice at 10 a.m., Cannes at 10.27 a.m., Toulon at 11.59 a.m., and Marseilles at 1 p.m. From Marseilles to Avignon the 75.3 miles are run in 77 min., the 77 miles on to Valence in 76 min., and the 65.8 miles to Lyons in 76 min. Leaving Lyons at 5 p.m., the Pullman covers the 122.1 miles to Dijon in 125 min., the 99 miles thence over Blaisy-Bas to Laroche in 101 min., and the

final 96.2 miles into Paris in 101 min., making a total of 5 hr. 35 min. from Lyons, 9 hr. 35 min. from Marseilles, and 12 hr. 35 min. from Nice—respectively 15, 20, and 15 min. more than the times of the down journey, but still at very creditable speeds. For high speed long distance travelling, the Côte d'Azur Pullman takes second place in Europe only to the Sud Express of the neighbouring Paris-Orleans-Midi Railway.

Forthcoming Events

Dec. 26-Jan. 5.—Schoolboys' Own Exhibition, at New Horticultural Hall, Vincent Square, London, S.W.1.

Jan. 1 (Tues.).—Institute of Transport (Bristol), at Bristol University, 5.40 p.m. "Commercial Aviation," by Mr. N. Edgar.

Jan. 3 (Thurs.).—Institution of Locomotive Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. "A System of Limit-Gauging Controlled by Colours, with Special Application to Locomotive Repairs," by Mr. G. L. Murray.

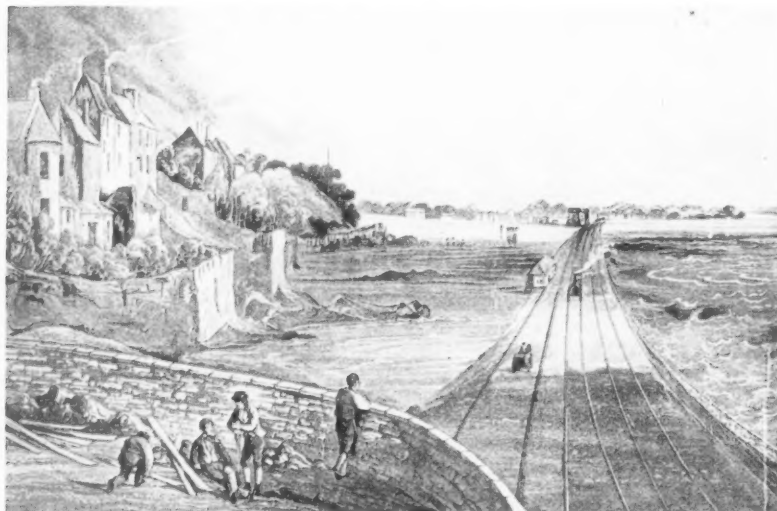
Jan. 7 (Mon.).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. "Peace or War," by Mr. G. Le M. Mander, M.P.

Permanent Way Institution (London), at Waterloo Station (S.R.), 7 p.m. "Continental Railways," by Mr. W. A. Willox.

Irish Railway Centenary Re-union Dinner

In connection with the centenary of Irish railways, to which we referred editorially in our issue of December 14, the Great Southern Railways Company decided not to organise any official

of the railways. Past officers had left to those still bearing the yoke of active service a record of achievement and a heritage of which their successors were justly proud.



Early view of the Dublin & Kingstown Railway from Black Rock, looking across Dublin Bay towards Williamstown and Merrion, with Dublin in the distance. This railway, the first in Ireland, was opened a hundred years ago, on December 17, 1834

(Reproduced by courtesy of McCaw, Stevenson and Orr Limited of Belfast)

celebration, nor to issue literature on the subject.

The past and present chief officers of the railway and steam packet companies associated with the Irish Railway Clearing House decided some little time ago, however, to mark the centenary year by a re-union dinner, which was held at the Royal Hibernian Hotel, Dublin, on Wednesday, December 12, and proved to be a large and successful gathering. The chair was taken by Mr. W. H. Morton, M.I.Mech.E., General Manager, Great Southern Railways, who is Chairman of the Irish General Managers' Conference for the current year.

In proposing the toast of the "Past Officers" Mr. Morton said that the younger men still in the service owed a great debt to the past officers, to whose skill and judgment was due whatever physical and financial stability the Irish railways now retained. He referred specially to the Rt. Hon. H. G. Burgess as the veteran and ablest of all past officers, who, beginning in a very modest way on the Dublin, Wicklow & Wexford Railway, attained to the position of control of the largest transport organisation in the world. Railway and steamship management following the period of the great war had called for sound and unerring judgment and an acute discernment of the trend of events as they affected, or might affect, the well-being

The Rt. Hon. H. G. Burgess, in reply, referred, in a most interesting and racy speech, to the "old timers" with whom he personally had come into contact on the Irish railways 50 to 60 years ago. Also, to the great delight of his audience, he related many amusing episodes of his own early days on the Dublin, Wicklow & Wexford Railway. He wished the present railway and steamship officers every success in their work, which, he reminded them, was subject to the constant examination and criticism of the men who had gone before. Mr. E. A. Neale, formerly General Manager, Great Southern & Western Railway, and Mr. Thomas Elliott, formerly Commercial Manager, Great Southern Railways, also responded to the toast.

The other toasts proposed were "The Railway and Steamship Companies," proposed by Mr. Joseph Ingram, late Secretary of the Irish Railway Clearing House and former Director of Transport for the Free State Government, and responded to by Mr. J. B. Stephens, General Manager, Great Northern Railway, Mr. J. M. Irwin, Irish Traffic Manager, L.M.S.R., and Mr. David Barry, O.B.E., General Manager, British & Irish Steam Packet Company; and "The Present Officers," proposed by Mr. C. E. Riley, M.A., formerly General Manager, Great Southern Railways, and responded to by Mr. W. F. Minnis, General Manager, Belfast & County Down Railway, and Mr. P. J. Floyd, Traffic Manager, Great Southern Railways.

2-8-4 Locomotives on U.S.A. Railways

The total number of locomotives of the 2-8-4 wheel arrangement on the railways of the U.S.A. is now 298, the first having been put into service

in 1925. The following list of these locomotives is taken from a recent issue of our American contemporary, the *Railway Age* :—

Road	Builder	No.	Date	Weight, Lb.	Cylinders, In.	Drivers, In.	Steam Pressure, Lb.	Tractive Force, Main Cylinders
B. & A.	Lima	55	1925	389,000	28 x 31	63	240	69,400*
Ill. Cen.	Lima	50	1926	388,000	28 x 30	63	240	69,400*
C. & N.W.	American	12	1927	397,000	28 x 30	63	240	67,200*
Erie	American	25	1927	443,000	28 x 32	70	225	70,000*
Erie	Lima	45	1927	457,500	28 x 32	70	250	72,000*
Erie	Baldwin	35	1928	461,470	28 x 32	70	225	71,000*
B. & M.	Lima	25	1928-9	393,000	28 x 30	63	240	69,400*
T.H. & B.	Montreal	2	1928	383,000	28 x 30	63	240	69,000*
N. Pac.	American	5	1928	404,000	28 x 30	63	240	70,500*
N. Pac.	Lima	25	1929	412,200	28 x 30	63	240	69,400*
A. F. & S. F.	Baldwin	4	1927	396,500	27 x 32	63	220	68,200*
N.Y.C. & St. L.	American	15	1934	416,000	25 x 34	69	245	64,100

* Equipped with booster which adds 12,000 lb. to 13,500 lb. to rated tractive force

P.L.M. FLOWER TRAFFIC—The P.L.M. Railway has issued an attractively coloured folder showing the times of the principal parcels and passenger trains by which flowers can be despatched from the Riviera towns for rapid delivery in France and abroad. When sent as express parcels, consignments are put on board all except *Wagons-Lits* expresses and reach their address within two hours of arrival at

the station. From Nice, Antibes, Cannes and Hyères, flowers are sent to Paris in one day, to London, Belgium, Holland, Germany and Denmark in two days, and to Norway, Sweden and Poland in three days. Flowers for delivery in Paris can be sent from Nice in refrigerating vans on a special express parcels train leaving at 8.30 p.m. and arriving in the capital at 9.29 p.m. the following night.

RAILWAY NEWS SECTION

PERSONAL

We regret to record the death, on December 21, of Sir John William Gilbert, a member of the London Passenger Transport Board, appointed on the formation of that authority as a part-time member for a period of three years. He was an Alderman and former Chairman of the London County Council. Born in 1871 and a graduate of London University, he devoted much of his public life to education and in particular that connected with the Roman Catholic faith. He was a member of the Senate and subsequently of the Court of London University, by which he was honoured by the conferment of a degree of Doctor of Laws (*honoris causa*), last November. Sir John was actively interested in many charitable institutions and was created a K.B.E. in 1922. A Requiem Mass was held at Westminster Cathedral yesterday morning, December 27.

Mr. A. G. Wansbrough has been elected a Director of A. Reyrolle & Co. Ltd., and the Parolle Electrical Supply Co. Ltd.

We regret to note the recent death of Mr. L. S. Deane, Controller of Railway Accounts, Railway Board, Government of India. Mr. Deane, who was 52, was one of the best known Davis Cup lawn tennis players in India.

INSTITUTE OF TRANSPORT

Election of Corporate Members

Member:—Mr. H. K. Bostock, Superintendent of Motive Power and Equipment, Nigerian Government Railway.

Associate Members:—Messrs. H. Aldcroft and F. W. Watts, L.M.S.R.; E. E. Askins, L.P.T.B.; D. S. Lewis, L.N.E.R.; J. Quick, Rhodesia Railways; A. G. Thomas, G.W.R.; and F. Williams, New South Wales Government Railways.

Admission of Non-Corporate Members

Graduates:—Messrs. E. H. Ash and R. C. Ray, Southern Railway; T. Barracough, C. Luke, A. F. J. Miles, W. Pye, T. Ridley, T. L. Saunders and H. J. L. Suffield, L.N.E.R.; D. Beedie, J. M. Hanna, J. T. Radford, A. B. Robinson and W. G. Williams, L.M.S.R.; T. W. David, V. F. Jefferies, S. G. Lang and E. R. Woollett, G.W.R.; C. Rezelman, S. E. Witt, South African Railways and Harbours; R. L. Maby, Port of Bristol Authority; and J. E. Jack, Great Indian Peninsula Railway.

Students:—E. Haynes, G.W.R.; A. B. Jefferies and A. W. Nix, L.N.E.R.; G. P. J. Joubert, L. Lewin and G. E. Smith, South African Rail-

ways and Harbours; G. Mead, Southern Railway; and R. G. Wilson, L.M.S.R.

INDIAN RAILWAY STAFF CHANGES

Mr. L. G. W. Hill, on return from leave, took over charge as Chief Engineer, B.N.R., on November 13, from

Mr. A. C. Austin, who reverted to Deputy Chief Engineer.

Mr. R. Mair has been appointed Deputy Agent (Organisation), E.I.R., as from October 13.

Mr. A. D. Dunsdon has been appointed to officiate as Deputy Chief Engineer, E.I.R., as from October 30.

PARLIAMENTARY NOTES

Supply of Electricity to Railways

In the House of Commons, on December 20, the Electricity (Supply) Bill was considered on report from the Committee of the whole House on the Bill. In the debate, discussion took place on clause 4, which provides for the supply direct by the Central Electricity Board to railway companies.

Sir Joseph Nall moved an amendment to provide that where electricity is required by a railway company for traction and the lighting of vehicles, the authorised undertakers concerned shall act jointly with the Central Electricity Board under a single agreement with the railway company.

Mr. Hore-Belisha (Minister of Transport) said that the amendment would destroy the clause. The railways suffered from the disability of not being able to profit by the size of their potential demand. There was no direct community of interest between the undertakers. There might be a number of different prices. Another disadvantage was that all the undertakers would be liable for the failure of one. The amendment would create complete chaos.

The amendment was negatived.

Sir J. Nall moved an amendment providing that no electricity supplied to a railway company by the Central Electricity Board shall, within the area of supply of any authorised undertakers, be used without the consent of those undertakers otherwise than for purposes of the company's railway undertaking.

Mr. Hore-Belisha said that if he accepted this amendment it would give the authorised undertakers a protection which they did not at present possess. No supply given for traction purposes could be used for other purposes except with the consent of the Minister. The amendment went further than any previous Act of Parliament, but as he was anxious to carry out an undertaking he had given, he would not stand in the way of the amendment's acceptance if the House desired to carry it.

The amendment was agreed to.

Sir J. Nall moved an amendment providing that where by reason of any supply of electricity given by the Central Electricity Board to a railway company any capital expenditure in-

curred by any undertakers for the purpose of supplying the railway company is rendered unremunerative the Board shall pay to the undertakers certain compensation, to be settled, if necessary, by arbitration.

Sir D. Somervell (Solicitor General) said that, taking haulage, there was nothing under the present law to prevent a railway company making an agreement at one time with one power company, and when that agreement came to an end, to take the power from another point. It would be a principle which could not be justified if they introduced into this clause a provision that there should be compensation for the fact that a contract was not renewed.

After a short discussion the amendment was negatived.

The report stage was concluded.

THIRD READING

Mr. Hore-Belisha moved the third reading of the Bill.

In discussion following, members congratulated the Minister of Transport on the way in which he had piloted the Bill, and expressed the hope that it would be beneficial.

Sir J. Nall, however, affirmed that the general objections to the Bill still remained. What was intolerable was that the Central Electricity Board should be pressing on the socialisation of the electricity industry, instead of concentrating on and controlling the generation of electricity.

Sir Philip Dawson regarded Sir J. Nall's condemnation of the Central Electricity Board at the present time as utterly futile. As the Bill now stood, he thought that it practically removed two dangers. One was the danger of unfair contract, and the second was removed by the Central Board not being allowed to become direct competitors with electrical undertakers. He welcomed the Bill, as long as it was perfectly clear that the railways would have to stand a fair proportion of the charge—cost, maintenance, depreciation, sinking fund, and everything else, and in connection with the installation that the Central Electricity Board would have to put up in order to supply them with electricity.

After further short discussion, the third reading of the Bill was agreed to.

Another Notable L.N.E.R. Run

An Ivatt Atlantic, 27 years old, hauls the Queen of Scots Pullman over the 185·8 miles from King's Cross to Leeds in 175 min. net

Another remarkable run was made over the L.N.E.R. main line between King's Cross and Leeds on December 11. The train concerned was the Queen of Scots Pullman, booked non-stop over the 185·8 miles in 194 min., and the load of 7 cars, weighing empty 277 tons, with passengers and luggage made a total of 290 tons, or almost exactly double the weight of the test train to Leeds on November 30. Contrast in motive-power between the two journeys was provided in the fact that the Pullman was worked, as usual, by one of the Ivatt Atlantics, No. 4433, now 27 years old, and unaltered from the original design of 1902 in any respect other than the provision of superheating and enlargement of the cylinders from 18½ in. to 20 in. diameter, while still retaining the comparatively short stroke of 24 in. The time and speeds of the Atlantic journey are set out fully in the annexed table, and a profile of the route appeared in *THE RAILWAY GAZETTE* of December 7, with the record times of the test journey behind Pacific No. 4472, *Flying Scotsman*, to which reference has already been made.

It will be seen that a very severe signal check occurred near Three Counties, bringing speed down from 85 m.p.h. to a walking pace; that other signal checks resulted in dead stands outside Doncaster and in Holbeck station for 40 sec. and 25 sec. respectively, though in both cases at points where speed would normally be low; and that signal checks of lesser severity occurred at Potter's Bar and Hare Park. Notwithstanding these delays, of which the total estimated cost was 10 min. 40 sec., the train reached Leeds in 185 min. 40 sec., or 8 min. 20 sec. less than the schedule time of 194 min. The net time of 175 min. gave an average start-to-stop speed of 63·7 m.p.h., and was 19 min. under schedule time; furthermore, it included an exceptionally drastic observance of Peterborough service slack, and the customary slowings at Doncaster, Wakefield and Holbeck. The permanent way check at Wakefield, closely adjacent to the usual service slack, barely affected the running times. From King's Cross to mile-post 155½, the start-to-stop time was 146 min. 10 sec., or 140½ min. net.; on these figures a stop could have been made in Doncaster station in 141 min. from London. Among other striking times were 120 min. 43 sec. for the 136·3 miles from Hatfield to mile-post 154, or 116½ min. net.; the average speed of 70·2 m.p.h. so maintained for two hours consecutively includes the dead slowing through Peterborough, and

the summits at Stoke and Markham. A particularly fine feat was that of maintaining an average speed of 62·2

L.N.E.R. QUEEN OF SCOTS PULLMAN
KING'S CROSS TO LEEDS
Engine: 4-4-2 No. 4433.
Load: 7 cars; 277 tons tare, 290 tons gross.
Driver: G. Malthouse (Leeds).

Distance		Schedule	Actual	Speeds
miles		min.	min. sec.	m.p.h.
0-0	KING'S CROSS	0	0 00	—
2-5	FINSBURY PARK	—	6 05	40
5-0	Wood Green	—	9 03	59
9-2	New Barnet	—	13 42	53
			<i>signs.</i>	30*
12-7	Potter's Bar	—	18 05	—
17-7	HATFIELD	24	23 16	76
22-0	Welwyn North	—	26 59	62
25-0	Knebworth	—	29 48	—
27-0	Mile-post 27	—	31 26	75
28-6	Stevenage	—	32 47	68
31-9	HITCHIN	37	35 25	—
34-0	Mile-post 34	—	36 56	85
			<i>signs.</i>	5*
35-7	Three Counties	—	39 17	—
37-0	Arlesey	—	41 25	—
41-1	Rigglewade	—	45 36	76
44-1	Sandy	—	48 04	73
47-5	Tempsford	—	50 40	81
51-7	St. Neots	—	54 02	72
56-0	Offord	—	57 16	82
58-9	HUNTINGDON	59	59 34	75
62-0	Mile-post 62	—	62 18	64
63-5	Abbot's Ripton	—	63 41	—
69-4	Holme	—	68 02	84
72-6	Maxley	—	70 28	—
75-0	Fletton Junction	—	72 22	75
76-4	PETER-			
	BOROUGH*	77	74 04	10*
79-5	Werrington Junc.	—	78 54	60
84-8	Tallington	—	83 48	69
88-6	Essendine	—	87 11	64
92-2	Little Bytham	—	90 31	66
95-0	Mile-post 95	—	93 19	55
97-1	Corby	—	95 32	60
100-1	Stoke	—	98 47	53
102-0	Great Ponton	—	100 38	76
105-5	GRANTHAM	108	103 24	72†
109-7	Barkstone	—	107 00	—
111-5	Bingham	—	108 24	81
113-5	Mile-post 113½	—	109 53	—
115-4	Claypole	—	111 19	77
118-0	Mile-post 118	—	113 14	83
120-1	NEWARK	120	114 48	—
126-4	Carlton	—	119 54	72
131-3	Dukeries Junc.	—	124 14	59
133-7	Markham	—	126 41	60
137-0	Mile-post 137	—	129 34	76
138-6	RETTFORD	138	130 52	66†
143-9	Ranskill	—	135 22	77
147-7	Bawtry	—	138 28	—
149-5	Mile-post 149½	—	140 09	62
151-3	Rossington	—	141 44	—
154-0	Mile-post 154	—	143 59	74
155-3	Mile-post 155½	—	146 10	<i>sign.</i>
156-0	DONCASTER*	155	146 50	<i>stop</i>
160-0	Carcroft	—	149 10	—
162-5	Hampden	—	154 00	65
164-7	South Elmsall	—	156 13	66
166-0	Mile-post 166	—	158 16	—
167-9	Hemsworth	—	158 36	54
169-0	Mile-post 169	—	161 27	62
170-4	Nostell	—	162 42	55
			164 08	66
			<i>signs.</i>	50*
171-9	Hare Park	—	165 41	—
174-2	Sandal	—	167 44	71
			<i>p. w. s.</i>	35*
175-9	WAKEFIELD*	177	169 32	—
178-3	Lofthouse	—	173 37	34
180-2	Ardsley	185	176 30	40
183-3	Beeston	—	180 02	60
			<i>signs.</i>	—
185-3	Holbeck	{ pass	183 10	<i>sign.</i>
		{ 192	183 35	<i>stop</i>
185-8	LEEDS	194	185 40	—
	CENTRAL			

* Speed reduced by brakes. * Service slack.

† Speed reduced by shutting off steam.

Estimated cost of delays:

Potter's Bar, 1 min. 10 sec.

Mile-post 34, 4 min. 10 sec.

Doncaster, 3 min. 20 sec.

Hare Park, 0 min. 30 sec.

Holbeck, 1 min. 30 sec.

Total, 10 min. 40 sec. Net time, 175 min.

m.p.h. over the 20·6 miles from Werrington junction to Stoke summit, which for the major proportion of the distance is on rising grades; on the ascent the minimum speed was 54 m.p.h. up the 1 in 200 to Corby, and 55 up the final 3 miles at 1 in 178 to Stoke. In view of the age and weight of the engine concerned, which is only 68 tons, this outstanding feat of locomotive performance, for details of which we are indebted to Mr. Thomas Adkins, is worthy of setting on record.

(See editorial note on page 1045)

STEEL SLEEPERS IN GERMANY.—

Writing in *The Times* of December 19, Herr I. R. Vogel, of the Gesellschaft für Oberbauforschung (Society for Permanent Way Research), explains why only one-third of the German State Railway is equipped with steel sleepers. He points out that in the annual report of the Reichsbahn for 1930 it was stated that timber and steel sleepers were considered to be of equal value, and a programme was laid down for using them in equal numbers in renewals. It is expected that this programme will be completed within the next few years. Hitherto the more extensive use of steel sleepers has been retarded because the old designs were weak. That has now been remedied. The difference in cost between the two kinds of sleeper is now very little, after taking into account the increased life and the ultimate scrap value of the steel sleeper.

NORTHERN IRELAND TRAFFICS.—Statistics of railway traffic and receipts in Northern Ireland for the first eight months of 1934, which have been furnished by the Ministry of Commerce, make comparisons with 1932, in view of the abnormal position created by the strike early in 1933. On railways wholly in Northern Ireland, the number of passengers in the eight 1934 months was 4,030,771, against 4,183,808, and the tonnage of merchandise and minerals 360,364, against 467,998. Receipts from passengers (including season tickets) for the eight 1934 months were £183,337, against £190,037. Goods traffic receipts for the eight 1934 months were £120,006, against £163,844 in 1932. On railways partly in Northern Ireland the number of passengers in the eight 1934 months was 3,688,489, against 4,098,242 for the first eight months of 1932, and the receipts from passengers were £290,586, against £326,894. Goods and livestock receipts amounted to £377,697 against £507,408, and the tonnage of goods and minerals was 622,298, against 765,808. It may be noted that in the month of August, 1934, passenger numbers and receipts were higher than in August, 1932, on railways partly in Northern Ireland, and fell very little short of the 1932 figures on railways wholly in Northern Ireland.

Ministry of Transport Accident Report

Conwil, Great Western Railway: June 21, 1934

This station is on the Carmarthen and Aberystwyth single line and the section concerned is that between Abergwili Junction and Pencader, a distance of 13½ miles, on which there are the three consecutive stations of Bronwydd Arms, Conwil and Llanpumpsaint. The ganger in charge of this 13½-mile section is stationed at the last-named place and he has had a maintenance motor trolley since last November for inspection purposes, and for moving the men of the gang to and from their work. The use of the motor trolley is associated with the occupation-key system. There is much curvature between Abergwili Junction and Conwil, as the line follows the river Gwili, and at the scene of the accident it runs in rock cutting and is on a curve of 9½ chains radius, with the view ahead restricted to about 90 yards.

Some old rails, lying between Conwil and Bronwydd Arms, had to be loaded up, and the ballast train from Carmarthen Junction arrived on the scene at 7.50 a.m., in possession of a Bronwydd Arms-Conwil electrical train staff. Instructions had been sent to the ganger at Llanpumpsaint the previous day that he and his men were to assist in loading up the rails, and the motor trolley arrived at Conwil at 7.50 a.m. Mr. Thomas, the stationmaster, had a short conversation with the ganger, Samuel Thomas, who was driving, regarding the time by which the ballast train should clear the section to avoid delaying an excursion train, and asked him to telephone in this connection from the trolley derailling point near which the ballast train was working as soon as he got there.

At this stage it must be remembered that a rule as to the use of motor trollies provides that if it is necessary to have occupation without a staff, tablet or occupation key, hand-signalmen must be sent out, which meant that if the motor trolley went towards the scene of operations and had no train staff or occupation key, it must be preceded by a flagman.

Seeing that the trolley was about to start, Mr. Thomas, who explained that he and ganger Thomas habitually spoke to one another in Welsh, asked "A oes flagman yn ei le?" (lit.:—Is the flagman in his place?), in reply to which, he said, ganger Thomas waved his arm and shouted "All right." The two men had been acquainted for many years, and Mr. Thomas was certain that his question could not have been misunderstood. The trolley then started, running past the starting signal, which had not been lowered for it.

Meanwhile, Ganger Morgans, with the ballast train, found that he had

not enough men with him to handle the rails and realised that as the staff was in the possession of the driver of the ballast train, the occupation key could not be obtained by the Llanpumpsaint gang at Conwil to enable their motor trolley to enter the section. To avoid delay on this account he uncoupled the engine of the ballast train and instructed the driver to run forward towards Conwil to pick up the Llanpumpsaint gang, and to return with them. Morgans said that although there was a telephone at a trolley derailling point close to where the train was standing, it was in a locked box for which he had no key, as he was not normally employed on that section of the line. It did not occur to him to use the guard's key, and to telephone to Conwil to inquire why the Llanpumpsaint gang had not arrived.

The driver of the engine, David Daniel Willitts, stated that on entering the rock cutting in which the accident occurred, he suddenly saw the trolley approaching round the curve. He was travelling at between 15 and 20 m.p.h. at the time and was unable to stop before the collision took place. The ganger, Samuel Thomas, was killed.

AWARDS FOR STAFF SUGGESTIONS, SOUTHERN RAILWAY.—On December 18 at Waterloo station, Sir Herbert Walker, General Manager, Southern Railway, presented the awards made for suggestions from the staff during 1933 and 1934. Before presenting the prizes Sir Herbert announced a revision of the scheme for the competition next year. As before, first and second prizes for holidays to the value of £25 and £10 respectively will be given, but instead of offering an additional award of £5 for the best suggestion from each division, there will be not fewer than five special prizes of £5 awarded for the most meritorious suggestions, no matter from what part of the system they may come. Sir Herbert said that he hoped this would produce suggestions of a higher standard. Particularly did he want suggestions for improving amenities for the general public. In 1933 about 600 suggestions had been received, of which 52 had been adopted in whole or part. During 1934 the number of suggestions made to date was 500; 35 had been adopted. The premier award for 1933-4 was won by Mr. T. Bravery, guard, Holborn Viaduct, for a suggestion resulting in an economy of £200 per annum in train working between Orpington, Charing Cross, and St. Paul's. The second award was to Mr. P. Walden, cloakroom clerk, Victoria station, for pointing out an advertising site, previously not utilised, which was bringing the com-

pany extra revenue to the extent of £200 per annum. The divisional awards of £5 each were allocated as follows:—
London Central: Mr. A. W. Izzard, leading motorman, Coudon North.
London East: Mr. F. E. Butcher, inspector, Woolwich Arsenal.
London West: Mr. R. C. Stevens, porter, Virginia Water.
Southern: Mr. A. W. E. Parsons, clerk, Bournemouth Central.
Western: Mr. F. Quick, foreman, Building Department, Exmouth Junction.

In addition two special awards of £5 were made to Mr. L. F. Hawkes, booking clerk, Hither Green, and Mr. H. H. Tester, cleaner, Batterssea Park Locomotive Depot.

POSTER SUGGESTIONS AND SLOGANS.—At a number of stations the Southern Railway has supplemented official printed advertisements by chalk or crayon announcements, often with designs in several colours, which have been drawn by members of the staff. These chalk advertisements, it has been found, have in most cases been very effective in calling attention to some special facility, service or fare, applicable to the particular station, and have been, therefore, very useful to passengers, and have helped to bring traffic to the company. To encourage this form of advertising, therefore, it is proposed to offer prizes half-yearly for the best designs in chalk or crayon advertising local excursions or facilities, prepared by members of the traffic staff, and displayed at stations for at least one week during the half-year.

NOTES AND NEWS

Reduced Austrian Fares.—The Austrian Federal Railways have this winter introduced 60 per cent. reductions in fares for the homeward journey for visitors from abroad who stay at least seven days in Austria.

Cylindrical Wheel Treads in France.—The Nord has recently tested passenger coaches with cylindrical instead of coned wheel treads. It is reported that even at the highest speeds the running was very steady.

More High-Speed Streamlined Locomotives.—The Chicago, Milwaukee, St. Paul & Pacific Railroad proposes to purchase two high-speed streamlined locomotives for passenger service from the American Locomotive Company.

Gold Medal for Canadian Railway Exhibit.—The award of a gold medal has been made to the Canadian National Railways Administration for the excellence of its display, featuring the evolution of railway transport during the last century, at the Canadian National Exhibition in Toronto.

Exhibition of Industrial Art.—The Royal Academy and the Royal Society of Arts are combining in the organisation of an exhibition of British Art in Industry, to be held in the galleries of the Royal Academy early next year. A programme of lectures, including architecture, commercial printing, lighting and smoke abatement, has been arranged. Posters will be among the examples of commercial art shown at the exhibition, which opens on January 5 next and will close early in March.

The Argentine Pensions Bill.—British railwaymen in Argentina are protesting against the decision of the Chamber of Deputies to uphold the new Pensions Bill, as sent to the Senate, and to reject the Senate's amendments. If the Bill is enacted as the chamber desires, pensioners will be deprived of the majority of their rights if they decide to live outside of Argentina. This was last referred to in our issue of October 20, 1933. Many pensioners and potential pensioners are said to be trying to get the British Government to take up the matter, states a Reuters message from Buenos Aires.

L.N.E.R. Scottish Service Alterations.—Announcement is made by the L.N.E.R. of a new service, operative from January 1, from Aberdeen, at 8.55 a.m., to Edinburgh, arriving at 12.4 p.m., and calling *en route* only at Montrose, Dundee, and Kirkcaldy. In the reverse direction, the existing 7.25 p.m. from Edinburgh to Dundee will be extended to Aberdeen, calling at Arbroath and Montrose and arriving at 10.43 p.m. An editorial note commenting on these changes appears on p. 1045. Two additional express services for business men are also announced between Edinburgh and North Berwick, leaving the latter at 8.25 and 9.15 a.m.,

and returning at 5.2 and 5.48 p.m.; the journey occupies 31 to 34 min. The 1 p.m. from Glasgow to Edinburgh is to discontinue calling at Linlithgow, and will make a further addition to the non-stop 55-min. service between the two cities.

Sale of C.P.R. Land Holdings.—A press message from Telfordville, Alberta, announces the disposal to a syndicate of all Canadian Pacific Railway land holdings in 28 townships in that area.

Unemployment Relief Scheme in Canada.—As a means for finding employment for a large number of single men, a 135-mile section of the Trans-Canada Highway between White River and Schreiber on the north shore of Lake Superior is to be built at the joint expense of the Governments of Canada and Ontario.

New C.N.R. Station for London, Ontario.—By pulling the handle which caused a steam shovel to pick up the first scoop of earth, Mr. George Wenige, Mayor of London, Ontario, recently started work on the construction of the underground concourse and waiting room which will be the first unit of the new Canadian National Railways station.

Fire Destroys Railway Warehouses.—Two warehouses of the Cordoba Central Railway situated in Palermo, a suburb of Buenos Aires, were destroyed by fire on November 28. A hundred firemen were required to prevent the fire spreading to 15 other buildings, including oil depots. Mr. D. M. Macrae, the General Manager, and other officials of the company watched the blaze.

Kingston Station Reconstruction, S.R.—Work has been begun on the reconstruction of Kingston station, where the whole of the existing buildings are to be replaced by a modern block of station offices on the down side with access from Ceres Road and from the corner between that road and Richmond Road. A concourse 70 ft. by 36 ft. will be provided. On the down side a new bay line 500 ft. long will be constructed on the same level as the other lines. This will take the place of the old low-level bay which was the original terminus of the line to Kingston via Twickenham. The existing down platform will be widened out to the new bay and the platform roofing of both platforms will be lengthened by about 60 ft., while the waiting rooms and other offices will be renovated and re-arranged. Two new subways will be constructed, one to give access from the new concourse to the up platform and the other, which is being constructed by arrangement with the local authorities, to take the place of the high-level public footpath where the Richmond Road passes under the railway bridge. A passimeter booking office will be

installed at the up platform. The total cost of the work is estimated at £40,000.

Argentine Railway Interest Charges.—The Argentine Minister of Public Works has given a ruling, according to a Reuters message, that the railway companies must not calculate interest on bearer warrants and overdrafts on cumulative preference shares among their working expenses, when stating claims for salary cuts.

Canadian Railway Accident.—Press reports from Ottawa state that, on December 26, a Canadian National express from Detroit to Toronto crashed at high speed into a special train filled with holiday travellers which was stationary in a siding at Dundas station, seven miles west of Hamilton, Ontario. At least 16 persons are stated to have been killed and more than 20 injured.

New 2-8-2 Type Freight Locomotives for India.—With reference to the illustration and description of the new 2-8-2 type freight locomotives, built by the Vulcan Foundry Limited, Newton-le-Willows, for the South Indian Railway, it should have been stated that these were built to the specification and under the inspection of Messrs. Robert White & Partners of Westminster.

San Paulo Railway Tariffs.—The directors of the San Paulo (Brazilian) Railway Company announce, according to *The Times*, that they have received advice by cable that the Minister of Transport has approved a schedule of rates and fares as recommended by a commission appointed by the Minister and approved by the company. Such schedule will come into force from January 1, 1935, and will take the place of a schedule under a sliding scale based on exchange.

Southern Railway Assessment.—The hearing of the appeal by the Southern Railway against the rating assessment of its railway hereditaments by the Railway Assessment Authority at £2,180,000, which was begun before the Railway and Canal Commission on December 10, was continued each weekday (except Saturdays) up to and including December 21, when the Court adjourned until January 16. It was contended by the railway company that the assessment should not exceed £500,000. Mr. William Marsh, Assistant to the Chief Mechanical Engineer, Southern Railway, giving evidence on December 13 and 14, estimated the replacement cost of the company's steam engines and tenders at £9,430,100, of 34,958 wagons at £5,449,740, and of 9,712 coaches at £17,254,275. Mr. H. N. Gresley, Chief Mechanical Engineer, L.N.E.R., giving evidence on December 14 and 17, and Mr. W. A. Stanier, Chief Mechanical Engineer, L.M.S.R., in his evidence on December 17 agreed generally with Mr. Marsh's figures. Evidence was also given by Mr. A. E. Moore, Audit Accountant, Colonel C. J. Francis, Stores Superintendent, and Mr. A. Howie, Joint Accountant, Southern Railway.

OFFICIAL NOTICES

THE Proprietor of British Patent No. 276,905 is prepared to sell the Patent or to licence British Manufacturers to work thereunder. It relates to railway sleepers.—Address: BOULT, WADE & TENNANT, 112, Hatton Garden, London, E.C.1.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to: *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

PATENTS for Inventions, Trade Marks, Advice, Handbook, and consultations free. King's Patent Agency, Ltd. (B. T. King, C.I.M.E., Registered Patent Agent, G.B., U.S., and Canada), 146, Queen Victoria Street, London, E.C. 4. 49 years' references. 'Phone City 6161.

CONTRACTS AND TENDERS

W. G. Bagnall Limited has received an order from the Great Western Railway for six pairs of creosoting trolleys for baulk timber for the Hayes creosoting plant.

Bogie Covered Goods Wagons for South America

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received an order from the San Paulo (Brazilian) Railway for 200 all-steel bogie covered goods wagons of 30-tons capacity. These wagons are to be equipped with Sheffield-Twinberrow patent bogies and Framwel axleboxes, and are being supplied to the inspection of the consulting engineers, Messrs. Fox & Mayo.

Taylor Bros. & Co. Ltd. has received an order from the Central Argentine Railway for 48 locomotive tyres.

Parry's Engineering Limited has received orders from the Indian Stores Department for a total quantity of 4,155 auxiliary bearing, bolster, draft, and buffer springs.

D. Wickham & Co. Ltd. has received a further order, since that recorded in this column in last week's issue, for seven petrol-driven gang trolleys and nine standard four-wheeled trailers for permanent-way maintenance, for the Central Uruguay Railway.

Leyland Motors Limited has received orders from railway-associated road transport operators as follow:—W. Alexander & Sons Limited, 25 oil-engined Lions; and Hants & Dorset Motor Services Limited, 10 double-decked Titans equipped with hydraulic torque converters.

Karrier Motors Limited has received an order from the L.N.E.R. for 35 Cob-Major four-cylinder 10-30 h.p. tractors, additionally to the order for 100 of the same type placed by the L.M.S.R. The tractors will be used in conjunction with four-ton detachable trailers on local collection and delivery work. Other orders for Cob-Major tractors include a fleet of fifteen for the South African Railways & Harbours Administration, following delivery to that administration of six Colt tractors for handling two-ton loads.

Bolling & Lowe Limited, on behalf of the S.A. du Nord de Liege, has received an order from the Peruvian Corporation for switches and crossings,

comprising 22 crossing frogs, 24 check rails and 24 sets of switches.

Robt. Stephenson & Co. Ltd. has received an order from the Central Uruguay Railway for two N2 class locomotive boilers.

It is announced that Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd. has received an order from the L.M.S.R. for the supply of ten 50-ton diesel-electric shunting locomotives.

New Coaches for China

The Birmingham Railway Carriage & Wagon Co. Ltd. has received an order from the Chinese Government Purchasing Commission on behalf of the Ministry of Railways, China, for sixteen third-class all-steel combined sleeping and day coaches. These vehicles, which are to be supplied under the inspection of the consulting engineers, Messrs. Sandberg, are for service on the Canton-Hankow Railway and will have a length of 70 ft. and will accommodate 72 passengers. The equipment will include J. Stone & Company's lighting equipment, Westinghouse vapor heating and Rex type vestibules.

Howell & Co. Ltd. has received an order from the Central Argentine Railway for 600 solid drawn Aquadiox steel boiler tubes.

The Egyptian State Railways Administration has placed the following orders:—

Ericsson Telephones Limited: Cables at total cost of £255 delivered f.o.b. Stockholm. (Ref. no. E.S.R. 30,115.); and telegraph and telephone materials, at total cost of £276 15s. (Ref. no. E.S.R. 34,284.)

Dr. Cassirer & Co.: Cable switchboard at total cost of £336 5s. 1d. delivered f.o.b. Hamburg. (Ref. no. E.S.R. 30,117.)

S. A. Baume & Mercier: Repairs to and strengthening of seven rail bridge metal superstructures by arc welding, at estimated price of L.E. 5,800·718 mills.

P. & W. MacLellan Limited: Supply of Administration's requirements of mild steel square bars for one year at an approximate cost of £768 11s. f.o.b. European port. (Ref. no. E.S.R. 301—G. 3/4.)

Johnson & Phillips Limited: High tension switchgear at cost of £755 f.o.b. (Ref. no. E.S.R. 333.)

Stewarts and Lloyds Limited: Signalling materials, item No. 3, total cost, £290 8s. 4d. f.o.b. Glasgow (Ref. no. E.S.R. 2,471).

Steel Peech & Tozer Limited has received an order from the Central Argentine Railway for 84 locomotive tyres.

Geo. Spencer, Moulton & Co. Ltd. has received an order for a total of 13,000 india-rubber springs from the Buenos Ayres Great Southern Railway.

The Agent, Burma Railways, Rangoon, invites tenders, receivable by

January 17, 1935, for the supply of miscellaneous tools and stores of English manufacture required during the official year 1935-36.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), New Delhi, invites tenders, receivable by January 21, 1935, for locomotive axles and tyres, wheels, and carriage and wagon axles.

The Sorocabana Railway Administration has called for tenders for the supply of metal component parts for (a) 320 30-ton covered wagons series "V"; (b) 80 gondolas series "H"; and (c) 50 gondolas series "FF," and also for the supply of 50 steel wagons series "VI" to be utilised in the conveyance of inflammable goods. Tenders will be received up to January 10.

Reference was made in our Overseas Railway Affairs section, on page 702, of the November 2 issue, to the forthcoming purchase by the Egyptian State Railways Administration of animal vans. Tenders for this stock, comprising 54 four-wheeled cattle trucks, have now been invited and are receivable by February 9 at the General Management, Cairo.

The Egyptian State Railways Administration invites tenders receivable at the General Management, Cairo, by January 15 for the supply of three locomotive boilers. Tenders are also invited receivable at the Chief Inspecting Engineer's Office, 41, Tothill Street, Westminster, S.W.1, for eight steel axles for Pullman cars, and also receivable by January 24 at the Superintendent of Stores' Office, Cairo, for the supply of three single and one double 60-ton weighbridges.

The South African Railways & Harbours Administration is calling for tenders, to be presented in Johannesburg by January 21, 1935, for the supply of train lamps and fittings during the period July, 1935, to June, 1936. Firms desirous of offering lamps and fittings of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

Mr. A. C. Fall, of British Timken Limited, leaves for Australia to-day to superintend the fitting of over 200 bearings to the axleboxes of thirty coaches on the Queensland Government Railways. These are stated to be the first tapered roller bearings to be used on the railways of Australia.

QUESTIONS IN PARLIAMENT

Freedom from Liability

Mr. Maclay asked the Minister of Transport on December 12 whether, as certain tickets issued by the main railway companies relieved the companies of claims in respect of damages to passengers through negligent acts of the railway companies or their employees, he would take steps to ensure that in future the railway companies would clearly mark those tickets to which no such liability attaches.

Mr. Hore-Belisha.—I have asked the railway companies to consider the hon. gentleman's suggestion and will in due course inform him of the result.

Workmen's Fares

Mr. Noel Lindsay asked the Minister of Transport whether he would take steps to bring to the notice of the Railway Rates Tribunal the need for a reduction in workmen's rail fares to correspond with the decrease in ordinary fares.

Mr. Hore-Belisha.—The standard fares for the conveyance of workmen by railway were fixed by the Railway Rates Tribunal and were brought into operation on January 1, 1928. They have since been reviewed annually by the tribunal. The matter is not one in regard to which I am empowered to intervene.

L.P.T.B. and Superannuation

Mr. McEntee, on December 17, asked the Minister of Transport, whether the L.P.T.B. was proposing to institute a superannuation scheme to cover all its workers.

Sir E. Warrender (a Lord of the Treasury) replied.—The London Passenger Transport Board states that it is not yet in a position to give consideration to the establishment of a superannuation fund to cover all its employees.

L.N.E.R. and London Electrification

Mr. McEntee asked the Minister of Transport, when it was proposed to give effect to the promise given to the House when the London Traffic Bill was under consideration, on behalf of the L.N.E.R., that local train services from Liverpool Street station outward would be electrified if the Bill became law.

Sir V. Warrender.—The railway company says it does not recollect that any promise was made to the House on its behalf in regard to this matter, which is still under consideration by the Standing Joint Committee of the main line railway companies and the L.P.T.B.

Chinese Railway Affairs

Mr. Moreing, on December 19, asked the Secretary of State for Foreign Affairs with regard to the continuing default of the Tientsin-Pukow railway loan, whether payments were being regularly made as promised into a reserve account intended for the even-

tual liquidation of the loan; and, if not, when the last payment was made and what instalment it represented.

Sir John Simon.—The answer to the first part of my hon. friend's question is No. In regard to the second part, I am informed that the last payment was made in October of this year representing the instalment due in September of last year.

Mr. Moreing asked the Secretary of State for Foreign Affairs what reply he had received from the Chinese Government to his suggestion made at the beginning of the year that the competent departments of the Chinese Government should forthwith, in consultation with the commercial counsellor of His Majesty's legation, devise means for resuming the interest services of the railway loans now in default.

Sir John Simon.—In response to the suggestion from His Majesty's Minister to China, a representative of the Chinese Ministry of Railways was appointed to discuss with His Majesty's Commercial Counsellor the question of railway loans in arrears. Discussions were duly initiated and were repeated at intervals during the present year until the departure in August last of His Majesty's Commercial Counsellor for duty in this country, where he is discussing the position with British interests concerned. On his return an opportunity will be sought of renewing the discussions, with the object of achieving a practical solution of the problem.

Sir N. S. Sandeman asked the Secretary of State for Foreign Affairs whether he had yet been able to obtain any reports from his representatives in China regarding the appointment by the Chinese Government in the spring of this year of a German professor as railway adviser.

Sir John Simon.—The press report of such an appointment was brought to the attention of His Majesty's Minister, but no confirmation has been received either from him or from any other quarter.

London Transport Board Staff

Mr. McEntee, on December 20, asked the Minister of Transport what was the approximate number of persons employed by the London Passenger Transport Board, under the following headings:—clerical and supervisory, shop-workers and running staff for omnibuses, tramcars, and trains, separately; and what was the approximate number under each heading at present subject to a superannuation scheme.

Mr. Hore-Belisha: I am informed by the London Transport Board that the staff numbers approximately 75,000, of whom about 4,500 are salaried grades and 70,000 wages grades. The wages grades are subdivided as follow: Operating staff, 46,000; engineering staff, 23,500; other staff, 1,000. I am not able to give an analysis of the staff

in the form desired by the hon. member. The board's records do not enable information as to the members of superannuation schemes to be given in the form required in the question, but I am informed that 2,600 of the salaried staff and 5,850 of the wages staff are members of superannuation, endowment, or pension funds, and that, in addition, there are *ex gratia* pensions and grant schemes, provisionally adopted by the board from the constituent undertakings, which cover all members of the Board's staff of long service.

Railway and Other Reports

Assam Railways & Trading Co. Ltd.—The directors have declared dividends of 4 per cent. on the pre-preference "A" shares and 3 per cent. on the new 6 per cent. preference shares for the half-year ending December 31, 1934, both payable on January 4.

Metropolitan Railway Country Estates Limited.—Sales of land during the year ended October 31 amounted to 36½ acres (against 32 acres during 1932-33). This brings the total sales up to 467½ acres and leaves 581½ acres still available. A profit of £33,462 (against £18,601) is shown by the accounts. The dividend is to be increased from 4 per cent. to 5 per cent. and £10,000 (against £3,328) is to be transferred to reserve, leaving £28,590 to be carried forward (against £22,628).

Central Railway of Chubut.—The report for the year to June 30 states that in regard to the Bill authorising the purchase of the company's undertaking by the Argentine State Railways, several matters still remain to be settled. No recommendation of a dividend is made, but as soon as the purchase contract has been completed and outstanding questions of rent and interest settled, a special meeting will be called to decide how to deal with such funds as may be available. The revenue account shows a net credit balance of £18,948 after providing for debenture interest and sinking fund.

Lincolnshire Road Car Co. Ltd.—Total revenue of this company, which is jointly controlled by the L.M.S. and L.N.E. Railways and Tilling & British Automobile Traction Limited, for the year ended September 30, 1934, was £163,204. After deducting expenses and depreciation there is a balance of £16,150, which, added to £10,493 brought forward, makes a total of £26,643. From this total the directors propose to appropriate £5,000 to reserve, to pay a dividend of 10 per cent. for the year, amounting to £10,000, and to carry forward £11,643. A number of local omnibus businesses was acquired during the year. The subsidiary company, Scunthorpe United Motor Services Limited, has been liquidated and its business merged into that of the parent company.

